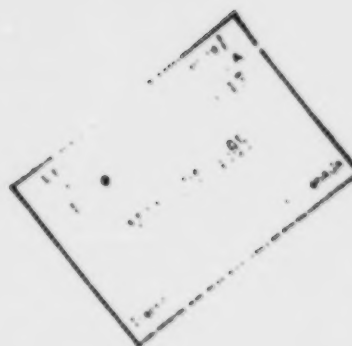


TP 6016E

PARATRANSIT IN CANADA:
A REVIEW

SUMMARY REPORT



by

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The contents of this report reflect the views of the Contractor and not necessarily the official views or policies of the Transportation Development Centre, Transport Canada. Where references are not quoted, the statements in the report reflect the experience of the project team.

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This report summarizes the findings of a study that reviewed and analyzed current paratransit applications in Canada. Paratransit includes demand-responsive bus and shared-ride taxi-transit services, special transportation systems for the physically handicapped, and ridesharing programs. The report provides a review of innovative technology, a discussion of current trends in regulatory and service policy changes, and a breakdown, by province, of funding policies for transportation for the handicapped. The report also includes a review of the following: - The role of taxis, with specific references to experience in Alberta, British Columbia and Quebec; - Current federal and provincial ridesharing programs; - Systems for the handicapped in small communities and rural areas; and, - Current issues and constraints in the implementation of paratransit services.			
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1. INTRODUCTION

1.1 Background

Canadian paratransit services have their origins in the demand-responsive dial-a-ride transit applications of the late nineteen-sixties and early nineteen-seventies. When interest in dial-a-ride systems peaked, there were some eighteen (18) operating systems in Canada. With the exception of the systems in Edmonton, Alberta, and in Pickering, Ontario, and a route diversion service in Ottawa, most of the dial-a-ride transit services using vans and small buses have since been discontinued.

The Canadian dial-a-ride systems generated interest in the marketing value of paratransit. Some systems were so successful in building up transit usage that the increased demand permitted the substitution of fixed-route transit. Others generated interest in doorstep service for the elderly and the handicapped (E & H). Still others that were unsuccessful led to a search for alternate strategies such as ridesharing that might work better in low-density areas. The fact that, with few exceptions, the dial-a-bus systems tended to be costly for public transit systems to operate (typically, \$3.00 per ride versus \$1.00 per ride on conventional transit) led to a greater interest in privatization, and particularly the potential for shared-ride taxi services.

With few exceptions, Canadian transit services for the handicapped have developed as multi-purpose transit systems in the very small cities and parallel services in the medium to large cities, rather than a program to retrofit the existing transit vehicles. The number of these special exclusive transit services has increased substantially during the past five years.

After fifteen years of experimentation, paratransit is an accepted mobility option in Canadian transportation planning. Hundreds of ridesharing projects have been implemented as well as hundreds of exclusive and parallel paratransit systems to serve elderly and handicapped passengers.

The federal government has a substantial current interest in paratransit activities. Within Transport Canada, the Transportation Development Centre (TDC) has a "long-term systematic effort in research and development (R & D) underway to bring about innovations and improvements in the transportation system. Emphasis is placed on R & D to achieve a higher level of transportation safety and efficiency as well as to ensure accessibility for all Canadians, including the elderly and the disabled."

1.2 Purpose and Scope of the Review

The purpose of this review and analysis of paratransit applications is to provide a current overview of Canadian experience to the R & D community. The scope of the review includes all the forms of paratransit described in Section 1.1 above.

The balance of the report is organized as follows:

Chapter 2 contains a discussion of the current trends in the application of paratransit techniques.

Chapter 3 describes current funding and service policies and systems developed to accommodate the elderly and the handicapped.

Chapter 4 describes the development of an accessible taxi to serve those persons using wheelchairs.

Chapter 5 contains a discussion of current ridesharing programs in Canada.

Chapter 6 provides a discussion of the current institutional and regulatory issues in rural areas and in small, medium-sized, and large urban centres.

Chapter 7 presents an analysis of current paratransit experience in Canada and the conclusions of this study with respect to the future of paratransit applications.

2. TRENDS IN PARATRANSIT SERVICES

2.1 Publicly-Operated Transit Systems

At present, there are three generalized forms of paratransit service in publicly-operated transit systems. These include: taxi feeder contracts, dial-a-bus systems and shared-ride taxi-transit systems. All of these applications provide a demand-responsive service similar to the dial-a-bus systems implemented in some eighteen (18) Canadian cities during the nineteen-seventies.

Regina's Telebus System, implemented in 1971, was typical of the dial-a-bus applications. It utilized small vehicles in the 18 to 30 passenger range, manually dispatched by two-way radio. Users could subscribe in advance or telephone for service. Dispatching was supported by a computer file of regular users. A range of services were provided beginning with feeder services to fixed-route buses and other destinations when demands were sufficient. Fare premiums of about 30 percent were charged. After ten years of service and daily volumes of passengers in the 3000 to 4000 range, the Regina Telebus service was replaced by fixed-route buses in 1981.

The dial-a-bus transit systems of the early nineteen-seventies addressed a specific problem of serving areas and periods of low transit demand. Typical conditions for the successful implementation of dial-a-bus included the following:

- Transit demand densities of less than 20 trips per square kilometre (50 trips per square mile).
- Transit vehicle productivities of about 18 trips per vehicle hour (typically 6 trips @ 20-minute intervals, or 9 trips @ 30-minute intervals).
- Average trip lengths of 4 to 8 kilometres (8 to 16 minutes).
- No competing fixed-route transit services.

(a) Pickering System: Canada's first dial-a-bus system was implemented by the GO-Transit system in the urban subdivision of Bay Ridges, Ontario, which was located within Pickering Township. Bay Ridges is now a subdivision of the Town of Pickering, a small residential community of 37,000 persons, some 32 km east of downtown Toronto. Bay Ridges was chosen for the initial Ontario dial-a-ride experiment mainly because there was no existing bus transit service in the community that would interfere with the monitoring and operation of the experimental service. Public response to the dial-a-bus service was encouraging and the system was found to be cost-effective during periods of low demand. The system is now operated during off-peak hours only by the Town of Pickering.

(b) Edmonton System: In late April, 1983, the Edmonton City Council revived the issue of paratransit services for the general public by requesting the Transportation Management Department to study the efficiency and effectiveness of implementing paratransit services by Edmonton Transit. The study looked at replacing regular bus services with off-peak paratransit during Monday to Saturday at night, and all day on Sundays and holidays. The

hours of operation were to be Monday to Saturday from 7:00 p.m. to 1:00 a.m., and Sundays and holidays from 6:00 a.m. to 1:00 a.m. One dial-a-bus application was chosen.

The service was operated between an outlying Community (Riverbend) and the Southgate Transit Centre, a major transfer point. The route consisted of two main parts. The first portion provided regular fixed-route bus service between the major transfer point (Southgate) and a node at the periphery of the community. The second portion offered dial-a-bus service from the node into the community utilizing a variable route and a fixed schedule.

Statistics for the system are as follows:

	<u>Riverbend</u>		<u>Millwoods</u>	
Implemented:	November, 1983		September, 1984	
	Before	After	Before	After
	60 min.	30 min.	60 min.	
Service Interval:				
Annual Vehicle Hours	4,290	2,860	7,488	5,720
Annual Vehicle Kilometres	85,800	57,200	149,760	114,400
Annual Ridership	34,320	34,320	51,480	51,480
Annual Operating Cost	\$117,460	\$86,433	\$205,021	\$168,121
Annual Revenues	34,320	34,320	51,480	51,480
Annual Subsidy	\$ 83,140	\$52,113	\$153,541	\$116,641

(c) Ottawa System: The Ottawa dial-a-bus application is called "The New Tele Transpo" service operated by O.C. Transpo on route #174 serving the Riverbrook and Knoxdale subdivisions in the southeast area of the City. The service is provided by demand-responsive fixed-route buses that divert off their regular route to serve the low-density subdivisions when requested. O.C. Transpo intends to use this technique where ridership does not warrant a regularly scheduled route. Statistics on the service were not currently available.

(d) Taxi Feeder Contracts: BC Transit is currently experimenting with a taxi feeder to a fixed-route Metro Transit service during periods of low demand on the Capital Region Transit System (Victoria, British Columbia). A decision to introduce taxis on the 78-North Saanich rush-hour bus route in Victoria was based on two objectives:

- to reduce costs on what had been a poorly patronized bus route;
- to test paratransit concepts to see if taxi-bus operations might have general application in other systems or services funded by BC Transit.

The taxi-bus service operates as an exact substitute for the former bus service. The same schedule is followed as before - no deviations from the fixed route are permitted. A small dashboard sign in the window of the taxi indicates that the taxi is operating the "78-North Saanich" route. Passengers are picked up on a "flag stop" basis. There are no bus stop posts or signs along the route except on a short portion where the taxi-bus follows a common routing with a regular bus service.

Passengers boarding the taxi in the outlying area must present a valid Metro Transit transfer, pay the single zone cash fare, or present a valid pass honoured by Metro Transit. The taxi-bus operator retains all transfers and cash. No receipts are issued, but the operator marks the passenger tally on a record log.

The return taxi trips at present are on an "honour fare" system for passengers transferring to the Metro buses because Metro Transit operators have refused to accept transfers from the taxi-bus service because of a jurisdictional dispute between the bus operators' union and Metro Transit concerning the taxi-bus operation. The taxi company operates the service at a contractually agreed hourly rate paid by BC Transit. Against this agreed price the taxi company is required to deduct the cash fares received and bill BC Transit for the balance each month. There is no direct audit or control system, but BC Transit conducts routine ride checks to verify the approximate validity of the billings.

The Saanich taxi-bus service has been reasonably successful, however the labour dispute was placing constraints on the service. This included:

- Metro Transit operators' refusal to collect transfers issued by taxi operators.
- Metro Transit information staff's refusal to provide telephone information or to print timetables advising potential taxi-bus users of the service.

Statistics for the analysis of transit service based on the consultant's analysis of BC Transit data before and after the taxi feeders were used for the month of May 1984, are as follows:

	<u>Before</u>	<u>After</u>
Monthly hours of service	126	126
Monthly passengers carried	250	350
Monthly cost	\$5,670	\$3,920
Monthly revenues	205	286
Monthly subsidy	<u>\$5,465</u>	<u>\$3,634</u>

(e) Shared-Ride Taxi-Transit Systems: Shared-ride taxi-transit services are operating in small communities in Ontario, Saskatchewan and Alberta. These include the following systems:

- Peterborough Trans-Cab, Peterborough, Ontario (since 1975);
- Battlefords Shared-Ride Taxi-Transit, North Battleford, Saskatchewan (implemented November 1978);
- Welland, Ontario, Taxi-Transit (since 1982);
- Vermilion, Alberta (elderly only since 1982);
- Pincher Creek, Alberta (elderly only since 1978).

2.2 Vehicle Guidelines

Three basic classes of vehicles have been used in Canada to meet the transportation needs of the disabled. These classes of vehicles include:

- small buses equipped with wheelchair lifts;
- vans equipped with wheelchair ramps or lifts;
- mid-sized and larger automobiles, driven privately or used as taxis.

In 1981 the Transportation Development Centre, Transport Canada, initiated a study to review the needs of paratransit service operators in the context of providing transportation to the mobility handicapped. Specifically the environment in which these services would operate was investigated with a view to providing guidelines to regulators and operators which would facilitate the introduction and successful operation of special vehicles. In addition, an extensive review of current and proposed paratransit vehicles was carried out to produce a set of desirable characteristics and specifications for the guidance of vehicle developers.

The project was carried out by consultants under the sponsorship of the Transportation Development Centre of Transport Canada and RTAC's Transportation Technology Technical Committee. The principal authors of the report were the consultants with final editing and format provided by the RTAC secretariat.

2.3 Overcoming Institutional Constraints

Paratransit has been described by one author as the "consumer's delight and the regulator's nightmare". In Canada "paratransit" remains a relatively unfamiliar term to much of the public, including many of the agencies which would regulate its operation, the potential operators of the services and current and potential vehicle developers. It is encouraging to note that the Canadian Urban Transit Association (CUTA) is becoming more interested in paratransit systems and services, reflecting the interest of its operating membership. CUTA has developed a policy paper on transportation for the handicapped and admitted the first operating member of a handicapped system at the fall meeting in November, 1984.

2.4 Evaluating Benefits

Attempts have been made to develop more appropriate service indicators to measure the productivity and cost of paratransit services. There has been an obvious need to include "level of service" considerations more explicitly. Calculations based on the usual transit financial considerations such as the cost per passenger mile make some forms of paratransit poor in comparison with conventional transit systems because the two do not provide the same level of service. Paratransit services can be shown to be a viable transit option if evaluated on the basis of the cost of an equivalent transit service. This often requires an economic analysis rather than fiscal considerations alone.

3. ACCOMMODATING THE ELDERLY AND THE HANDICAPPED

Canadian transit services for the handicapped have generally developed as multi-purpose systems in the very small cities and parallel services in the medium to large cities, rather than a program to retrofit existing transit vehicles. The number of these special exclusive services for the handicapped has increased dramatically during the past five years. The 1977 edition of the national "Guide for Travellers with Special Needs" listed fifteen (15) systems in the major cities. The 1981 edition of the travel guide listed eighty-five (85) systems. Table 3-1 provides some typical statistics for these systems for a range of different-sized urban communities in Canada. Currently the consultants estimate that there are approximately 300 systems in operation in Canada. More than 100 of these are located in the Province of Alberta.

Private/public partnerships operating systems for the handicapped exist in Alberta, British Columbia, Quebec and Saskatchewan. In Saskatchewan, parallel services are provided by non-profit agencies in the larger communities and by private enterprise in the small communities. In Manitoba, Quebec and the Yukon, parallel services are operated by the public transit system. In Ontario, the trend is toward operation by non-profit agencies and public agencies. In the Maritimes, there is a mix of private, public and non-profit agency participation. In many communities more than one service is available, including both subsidized and non-subsidized taxi services.

3.1 The Role of Taxis

A growing concern over the high cost of transporting E & H passengers in small transit-type vehicles is resulting in a shift to greater use of taxis. This is occurring in the larger cities of Alberta. A major shift toward the use of taxis has occurred in Quebec.

In January, 1982, Transport Adapte du Quebec Metro Inc., a specialized transport service and a subsidiary of the Quebec City Transit Commission, introduced the use of taxis for transportation of disabled persons throughout the metro area. This new measure substantially changed the operation of the system. The reported results of these changes are most positive for the Corporation, its users and the taxicab industry. The taxi service is reported to have accomplished the following:

- Service refusals were virtually eliminated.
- Costs per passenger trip were reduced by one-third.
- Substantially reduced travel times.
- Advance reservation notice reduced from 24 hours to 8 hours.
- Ability to provide service at times requested.
- Reduced bus vehicle requirements, with subsequent reduced capital outlays.
- New sources of income for the taxi industry.
- Overall, users better served than by conventional transit service.

City	Revenue Vehicle Kilometres	Total Vehicle Kilometres	Revenue Passengers Carried	Total Passengers Carried	Revenue Vehicle Hours	Passengers Per Hour
1. Edmonton	n/a	n/a	190,235	190,235	94,286	2.02
2. Victoria	248,039	248,039	27,600	27,600	13,957	2.00
3. Regional Municipality of Peel	177,833	356,899	35,113	37,345	17,268	2.04
4. Quebec City and Area	n/a	253,286	65,982	65,982	n/a	1.90
5. Ottawa- Carleton	1,765,324	1,765,324	172,614	172,014	74,510	2.31
6. Town of Oakville	n/a	64,700	9,893	9,893	n/a	2.00
7. Hamilton Municipality	n/a	581,026	102,890	102,890	32,000	3.22
8. Winnipeg	493,198	493,198	65,674	65,674	32,016	2.05
9. London	n/a	304,850	39,152	39,152	19,821	1.97
10. Windsor	n/a	199,000	25,343	25,343	9,930	2.55
11. Montreal Urban Community	n/a	1,990,987	179,398	179,398	n/a	n/a
12. Ville de Laval	n/a	384,116	41,464	41,464	14,588	2.80
13. Area of Montreal South Shore	n/a	301,640	21,709	23,046	16,396	n/a
14. Toronto	n/a	n/a	273,662	273,662	181,757	1.51
15. Calgary	2,082,051	3,852,569	377,900	377,900	131,192	2.80
16. Vancouver	1,748,767	2,974,146	347,146	365,239	169,071	2.05

Source: 1982 CUTA Survey

Table 3-1 Characteristics of Transportation Systems for the Handicapped in Canadian Cities

3.2 Innovative Funding Policy for Small Communities and Rural Areas

The Province of Alberta has a unique Public Transportation Operating Assistance Grant (PTOAG) program. All towns, villages, rural municipalities, municipal districts, and "special areas" have received \$2.00 per capita yearly since 1980 based upon the latest population figures derived from the municipal census. More than one hundred communities have used these funds to provide some form of paratransit service. The grant was increased to \$3.00 per capita in 1984.

The primary objectives of the PTOAG program were to provide assistance to communities where public transit was not available in two major areas:

- The development of specialized transportation services for senior citizens, the disabled and the handicapped.
- Subsidization or upgrading of existing transit services (i.e. taxi) in a municipality, for the benefit of senior citizens, the disabled and the handicapped.

The grant is working well and fulfilling its original objectives. The elderly and handicapped are receiving improved public transportation services, both where there were none previously and where services were present. Municipalities have demonstrated a great deal of initiative and employ a variety of applications specific to their local transportation needs, including subsidized taxis, lift-equipped vans and charter buses.

3.3 Dual-Purpose Systems

Many communities, too small for both conventional transit systems and systems for E & H passengers, have installed dual-purpose systems serving ambulatory and non-ambulatory needs with one system. Examples of this are the Battlefords Taxi-Bus system in Saskatchewan and systems in several small communities in British Columbia.

3.4 Public/Private Partnerships

The use of public/private partnerships to operate systems for the handicapped is most apparent in Alberta and British Columbia. In Saskatchewan these special services are provided by non-profit agencies in the larger communities and with private enterprise in the small communities. In Ontario the trend is toward operation by non-profit agencies and public agencies, and in the Maritimes there is a mix of private, public and non-profit agency participation.

In the Province of British Columbia, BC Transit has substantial experience with transit contracts with private companies to small communities. Current "paratransit" services are operated in some eighteen (18) communities using vehicles supplied by the province through contractual arrangements with the private operators and the local governments. Of these systems, ten (10) are classified as multi-purpose paratransit systems.

3.5 Urban Funding and Service Policies by Province

Table 3-2 provides a summary of the funding arrangements for special transportation services for the elderly and the handicapped, by province, in Canada.

Province	Program & Admin- istering Dept.	Eligibility Criteria	Delivery Mechanism	Funding by Province
Alberta (1979)	Alberta Transporta- tion: - Special trans- portation serv- ices for the elderly, the handicapped and the disabled.	Edmonton system is for "adults who would have difficulty using regu- lar transit." Other communities serve broader categories, all ages and handi- caps.	Municipality is responsible for deli- very. Several provider options.	50% of study costs. All rural and urban communities receive unconditional grants of \$3.00 per capita.
British Columbia (1980)	BC Transit: - tests accessible buses. - Handy DART or Custom Services.	To assist persons who cannot use conven- tional services with- out assistance. Includes all ages, incomes, and mental handicaps.	Municipality is responsible for local delivery; several options. BC Transit financial planning and techni- cal advice to muni- cipalities. Also signs agreements.	50% of feasibility study costs, plus technical support. 5-year phase with provincial share of operating cost moving from 73-76% to 66-68%. Province leases fleet to municipality. Farebox expected to cover 10% of costs.
Manitoba (1977)	Urban Affairs Handi Transit Demo projects (Winnipeg, Brandon)	Introduced on demo basis in two cities. Few rural areas served. Eligible users are the physically handi- capped who cannot use public transit. Initially, wheelchair users only.	Municipality pro- vides vehicles. Province sets out initial expecta- tions of service.	Municipal - 50%. Provincial - 50% (some UTAP funds). Maximum \$500,000 each year. Funding mechanism has changed.
New Brunswick	No. specific policy.	By Municipality.	Fredericton has service.	(UTAP).

Table 3-2 Survey of Service Policies for Transportation for the Handicapped Across Canada

<u>Province</u>	<u>Program & Admin- istering Dept.</u>	<u>Eligibility Criteria</u>	<u>Delivery Mechanism</u>	<u>Funding by Province</u>
Newfound- land	No specific policy.	By municipality.	St. John's has service.	
Nova Scotia (1979)	Municipal Affairs.	Demonstration projects began services and will be used to formu- late policy.	Provided on a basis of \$1.00 per capita.	(UTAP).
Ontario (1979)	Ministry of Transportation & Communications. Transportation for the Physica- lly Disabled.	Any municipality, regardless of whether they have existing public transit. Definition of user is physically disabled person who is unable to board regular transit facilities. No age, income limi- tation. Includes mentally handicapped who meet definition.	Municipality sets up systems and selects own operator. Province reviews contracts and proposals. Explicit statement of service and safety standards and administrative procedures and monitoring. Provides technical assistance to municipalities.	50% of capital and operating costs, up to a ceiling calcu- lated on a per capita basis, e.g. under 100,000 - \$2.00/p.c.; over 100,000 - \$1.70/ p.c. 75% of cost of features which make conventional transit easier to use.
P.E.I.	No specific policy, Social Services Sub- sidy in Charlottetown.	By municipality.	Charlottetown has service.	
Quebec (1979)	Minister des Transports. Subventions au Transport des Personnes Handicapees.	Any municipality although few rural systems. Definition based on ability to use con- ventional transit with dignity.	Municipality is key. Initially had eight pilot projects.	Province-wide. - 75% capital. - 50% operating.
Saskat- chewan (1975)	Department of Highways and Transportation: - Urban Assist- ance for the Transportation of the Handicapped.	"To assist all per- sons who cannot use conventional transit systems with dignity". Municipalities define eligibility.	Municipality. Most centres con- tract out to SCCCA; cities own vehicles and pay operating deficits. Province sets out certain service conditions and standards and pro- vides support to municipalities to set up operations.	Province shares costs of various items: - 75% of acquisition of rolling stock. - 50% of operating deficit. - 75% of handicapped transit construc- tion, e.g. curb cuts. - 75% for studies and demonstration projects.
Yukon	No specific policy.	By municipality.	Whitehorse has service.	

Table 3-2 Survey of Service Policies for Transportation for the
Handicapped Across Canada (continued)



Figure 4-1 Illustrating the Production Model of the Dual-Purpose Taxicab
(Courtesy of North Shore News, Ellsworth Dickson photo,
North Vancouver, B.C.)

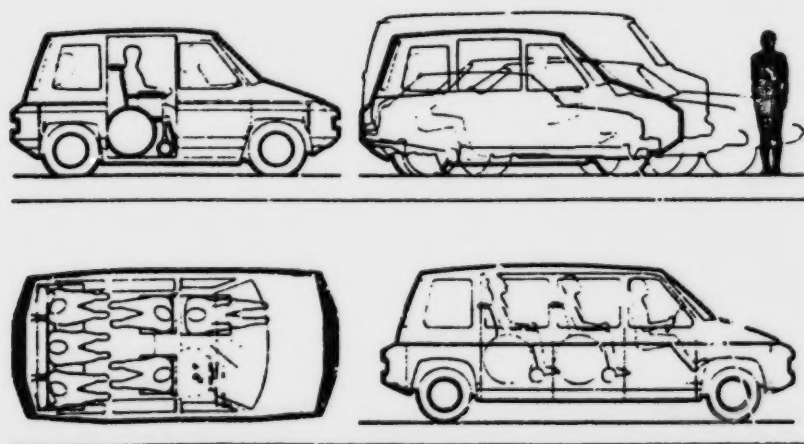


Figure 4-2 Illustrating the GSM Taxi Design Concept
(Courtesy Taxi GSM Ltée., Montreal, Quebec)

4. DEVELOPMENT OF A TAXI VEHICLE FOR THE DISABLED

During the late nineteen-seventies, the Transportation Development Centre of Transport Canada sponsored a series of studies of appropriate vehicles for the transportation of the disabled. One result of this research was the development of prototype taxi vehicles by GSM Taxi Ltd. of Montreal. Financial support for the development of the GSM Taxi was provided by the Federal and the Quebec governments. The proposed GSM Taxi has a capacity of five passengers, three on a bench seat and two on folding seats which can be raised to provide space for a wheelchair occupant. Cost estimates for the GSM vehicle were between \$20,000 and \$30,000 in 1981 when the company was demonstrating its prototype wheelchair taxi.

The commercial production of the GSM Taxi was delayed until 1984, when it was announced that Magna International Inc. of Toronto would establish a company to complete production development by 1986. A prototype vehicle in the form of a small police van was exhibited in November 1984. This vehicle is expected to be adapted to accommodate wheelchairs. The necessarily long lead time required to bring a new taxi vehicle into actual assembly and marketing stimulated a search for a more short-term solution in Vancouver.

Unique taxi vehicles designed to serve ambulatory and non-ambulatory persons are being operated in Vancouver, B.C. The taxis, which accommodate passengers within wheelchairs, are known locally as the "camel cabs" because of their distinctive raised roofs. The legal operation of these taxis was made possible by the intervention of the City of Vancouver in the historic process by which taxi licences are obtained.

4.1 Limitations of Conventional Taxi Vehicles

Most transportation systems for the disabled have provided lift-equipped buses or vans even where subsidized taxi services are operated. This has been necessary because of both the access and wheelchair storage space limitations of vehicles currently used as taxis. Current trends toward smaller-sized vehicles indicate that these problems will be more acute in the future. What is needed is a taxi designed for easy access to elderly and handicapped persons in a smaller, fuel-efficient vehicle. Such a vehicle has generated substantial research and investigation by both government and industry.

4.2 Community Support for a Wheelchair Taxi

Community support for an improved taxi vehicle in Vancouver came from a variety of local advocate groups, taxi businesses and municipal committees reporting to the Vancouver City Council. The disabled community, represented by such groups as the British Columbia Division of the Canadian Paraplegic Association and the local G. F. Strong Rehabilitation Centre, wanted to find more convenient transportation for persons using wheelchairs.

In 1975 Rehabilitation Consultants for the British Columbia Division of the Canadian Paraplegic Association, were attending a conference in Tampa,

Florida. When requesting a taxi to the airport, they were surprised when the dispatcher asked them if they would like a wheelchair taxi. The driver arrived and wheeled them into a taxi-van; at the airport they were wheeled from the taxi to the inside of the terminal. The convenience of the wheelchair taxi service inspired both men to work toward a similar service for the Vancouver area.

In August, 1981, staff of the Permits and Licences Department attended a demonstration of the GSM wheelchair taxi prototype. The GSM vehicle was attractive because it met the City standards for Class "A" taxi licences and would also be able to service handicapped and elderly passengers. In October the Department recommended the vehicle to the Standing Committee on Finance and Administration for the following reasons:

- It was capable of transporting a person using a wheelchair plus two other passengers.
- The high door and ceiling provided easy access for elderly passengers.
- It was Canadian built.
- The unique design (similar to a London Cab) would be a showpiece for Expo 86.

In October 1981, the Director of Permits and Licences and the City Manager of the City of Vancouver recommended the introduction of a new Class "D" Dual Taxicab licence. With the concurrence of the Director of Legal Services, the City requested that the Vancouver Development Corporation be instructed to offer thirty (30) Class "D" licences for sale on a bid basis subject to the applicant entering into an agreement to provide GSM taxicabs only, by the end of 1983.

The Council Committee on the Disabled felt that the GSM taxicab was "eminently suited" for transportation of the disabled and that a City subsidy would not necessarily be required because funding for the disabled is available from a number of sources.

The City of Vancouver offered the thirty (30) Class "D" licences for sale until December 30, 1981. The Information to Bidders specifically stated that offers for less than the entire thirty (30) Class "D" dual taxicabs would not be considered, and that the highest bid would not necessarily be accepted.

The dual-purpose taxicab licence for a low licence fee of one hundred fifty dollars (\$150.00) was based on economic considerations for the taxi company owner. A licence which could be used for Class "A" purposes and Class "D" purposes enables the owner to keep the entire fleet of taxis in use. The low per annum fee was intended to compensate for the higher costs of specially-built taxis. The licences were awarded to Vancouver Taxi Ltd. based on the firm's proposal.

4.3 The "Dual-Taxicab" Operator

The City of Vancouver put several restrictions on the taxi operator. These include the conditions that:

- The taxicab must be a four-door sedan type of vehicle, commonly known as a GSM taxicab or of a similar type.

- The owner must advertise in the Yellow Pages of the Vancouver Telephone Directory indicating the company trade name, its capability to serve passengers using wheelchairs, and that requests from passengers using wheelchairs would receive a priority over all other requests.
- Each taxi driver was to record on the "daily record of trips" every trip that involved the transportation of handicapped persons and, in each case, whether the person was using a wheelchair.

Approval of the Vancouver Taxi Ltd. application was based on an agreement that the service would be fully operational by year end 1982. However, by September 1982, the taxi company informed the Superintendent of Motor Carriers of the British Columbia Motor Carrier Commission that GSM Taxi Ltd. of Montreal could not supply the necessary vehicles on schedule, and a search was undertaken for an alternative taxi vehicle.

4.4 The Manufacturer

Levett Auto Metal Ltd. of North Vancouver, British Columbia, is an experienced heavy vehicle repair garage with a reputation for innovative and high quality vehicle fabrication. This firm is a major rebuilder of buses for western Canadian bus lines and transit systems.

The prototype taxi was examined by the Vancouver Board of Vehicles for Hire in April 1983. A practical demonstration was given to show the procedure for loading and unloading a person in a wheelchair. Levett Auto Metal Ltd. received approval from the Vancouver Transportation Committee and the Board of Vehicles for Hire conditional to approval from the B.C. Motor Carrier Commission, Ministry of Transportation and Highways, and the Motor Vehicle Safety Branch of Transport Canada. The prototype was tested for the following characteristics:

- body conversion sufficient to withstand side impact in a collision,
- rollover roof strength,
- tie-down anchor point strength,
- wheelchair tie-down harness,
- window glazing,
- burn rate of materials used,
- adequacy of door locks and hinges.

The first vehicle tested and approved by all of the above agencies was available for service in June 1983. Levett Auto Metal Ltd. then began work on patterns and dies to facilitate assembly-line production of thirty (30) dual taxicabs. The search for more used Checker Cab taxi vehicles began.

The Checker vehicle was chosen because it was sufficiently large and heavy for the necessary modifications (see Figure 4-2). The main features of the modification are:

- roof raised twenty-five and one-half centimetres (25.5 cm) and reinforced for added strength,
- enlarged windows,
- double-hinged rear side doors for wider access,
- sliding metal ramp stored underneath the vehicle, with

- interior locking device to secure ramp storage while in transport and red dashlight to warn driver when the ramp is not securely locked,
- altered rear passenger seating to provide more floor space for the wheelchair,
- special floor matting which allows the wheelchair to maneuver without slipping,
- four ratchet-type tie-down belts to secure the wheelchair.

4.5 User Response

Arrangements were made to interview users of the "Camel Cabs", a nickname for Vancouver Taxi's dual cabs. Persons were given advance notice of an opportunity to discuss their experiences. Those who offered comments did so voluntarily. The following is a representative sample:

- Sitting sidewise is not comfortable for some persons due to neck strain.
- Additional driver training is needed with respect to tie-down straps.
- When a person in a wheelchair needs to sit with a leg extended, it is a tight fit to close the door.
- The fares are expensive. (Regular taxi fares are charged.)
- The wheelchair taxi provides a convenient service.
- Sometimes the tie-down straps are twisted and the drivers are in too much of a hurry to attach all four straps.
- The impact of quick stops is greater for quadriplegics because they lack upper body muscle strength and balance to compensate for a jolt.
- Communities outside Vancouver have a need for such a service.
- The concept should be developed across Canada, since many persons who use wheelchairs travel.
- Before the wheelchair taxi, there was no way to get around the city on short notice.
- The wheelchair taxi service appears to be unique to Vancouver.
- Elderly couples travelling together where one uses a wheelchair are frequent users of the service.
- The service attracts a different group of users than those who use the BC Transit handicapped service.
- Drivers are obligated to take passengers in wheelchairs, whereas conventional taxi services are not.
- Some drivers are reluctant to use the access ramp.
- Drivers sometimes have difficulty with locking the ramp in place.
- The roof window is an asset for sightseeing.
- Fares covering the distance to and from a destination are not consistent.
- Fares too costly for a long trip.

4.6 Operator Experience

The operation of thirty (30) wheelchair taxis has been reasonably successful for Vancouver Taxi Ltd. It comprises about fifteen to twenty percent (15-20%) of total company business. Initial costs and replacement costs for the specially-built wheelchair taxis are higher than the same costs for regular taxis. The company estimates that it will take about two and one-half years to recover their initial costs.

5. RIDESHARING ACTIVITIES

Notwithstanding all the marketing efforts by transit and paratransit service operators during the nineteen-seventies, they were not able to satisfy all the needs of the commuters. Because of the energy crisis and the rise in automobile operating costs, ridesharing is emerging as an option that is attractive both for urban planners and commuters. The Canadian government, through Energy, Mines and Resources Canada (EMR), has established an incentive program to encourage ridesharing. EMR is preparing a marketing package for distribution in 1985. New projects have been recently implemented in Quebec, Nova Scotia and New Brunswick. Market studies have been undertaken by EMR in British Columbia, Saskatchewan, Manitoba and Alberta.

Ridesharing usually takes two major forms:

- the use of individually-owned automobiles rotated among persons who usually know each other and where there is no exchange of money;
- formally-organized arrangements between drivers and passengers.

5.1 Quebec Experience

Covoiturage Quebec Inc. is a private, non-profit organization founded by the Roads and Transportation Association of Quebec in 1982 through financial support from the Province of Quebec and EMR Canada. A board of directors representing business and transport and the municipal, provincial and federal governments is responsible for operating policies. Covoiturage Quebec was founded to promote ridesharing by working to remove institutional constraints and organizing pilot projects to demonstrate the validity of carpooling and vanpooling.

In 1983 Covoiturage Quebec was successful in influencing the Government of Quebec to legalize remunerated ridesharing. Currently the organization is working to obtain incentives for ridesharing such as reserved parking and the removal of toll charges as well as providing a "free" technical and advisory consulting service to promote ridesharing. The organization has the necessary resources to assist in the leasing of equipment and the organization of carpooling, vanpooling and shared-ride taxi service. Covoiturage Quebec works directly with business organizations and local governments to promote the development of ridesharing projects.

A survey was conducted by Covoiturage Quebec in 1984 to determine the current level of response to the concept of ridesharing. From this survey and other transportation statistics it was estimated that:

- Some 22% of all person trips by motor vehicles were being made in a shared-ride mode. (In Quebec this amounts to about 527,000 person trips.)
- By 1984 some 1,200 industry-based carpooling and vanpooling units had been established in the Montreal region alone. New units were being formed at the rate of three (3) to five (5) per week in the spring of 1984.
- In local municipalities some eighty (80) carpooling projects had

been established.

- In total, some 1,400 carpooling units and eleven (11) vanpooling units were in operation.

5.2 Ontario Experience

In Ontario, the majority of vanpools are either privately operated by an individual or sponsored by an employer. Currently 14 employees are operating a total of 126 vanpools in Ontario. There is also an alternative to the conventional types of vanpools: the vanpool agency, which will supply a van for commuter groups. In Ontario, this is OVPO, the Ontario Van Pool Organization, an affiliate of the Ontario Energy Corporation, which has been providing vans for commuters since 1980.

OVPO was originally set up to show that the concept of third party vanpooling could be entirely self-sufficient financially to the point of showing a profit, thereby encouraging the private sector to become involved. As a vanpooling agency, OVPO has the following characteristics:

- OVPO owns the vans, insures and maintains them. Should the vanpool fail or disband for any reason, the van can be returned to OVPO with only 30 days notice. Neither driver nor rider suffer a penalty.
- OVPO riders come from combinations of both the public and private sectors, with the only criteria being that the poolers' places of work and home locations are suitable for the operation of a vanpool. Consequently, OVPO can often organize vanpools that a single company might not be able to.
- Unlike most employer-sponsored or private vanpools, a margin to cover administration and profit is incorporated into the fares. As a result, OVPO fares are normally higher than those experienced with other vanpools.

The Government of Ontario has been actively involved in promoting a "Share-A-Ride" program since the late nineteen-seventies. Carpool and vanpool implementation handbooks, published by the Ontario Ministry of Transportation and Communications (MTC) were revised and updated in 1983.

5.3 Experience in Other Provinces

The City of Calgary, Alberta, is offering "free" downtown parking as an incentive. The Province of Alberta has offered employees forming carpools reserved priority parking space as an incentive. The employees must register their carpool and guidelines are provided. An organization known as "Vanpools Ltd." was created in Nova Scotia in 1981. By 1984 some fifteen (15) vanpools were in operation. In Fredericton, New Brunswick, some nineteen (19) park-and-ride lots have been established for carpooling.

5.4 Ridesharing Associations

Two national organizations actively promote ridesharing in North America. These are the Association for Commuter Transportation (ACT), formerly the National Association of Vanpool Operators (NAVPO), and the Canadian Association of Vanpool Operators (CAVPO), established in 1982. These two associations are to hold their first joint meeting in Toronto in April, 1985.

6. INSTITUTIONAL AND REGULATORY ISSUES

Paratransit by definition is a hybrid service combining various facets of operation, labour arrangements, vehicle types and dispatching systems. For paratransit to flourish, there must be room for local initiatives, entrepreneurship and flexibility. Overly restricted institutional procedures and constraints will kill it. Labour issues have plagued the U.S. systems more so than the Canadian ones because most paratransit systems in Canada are public systems. However, labour issues will definitely assume a new dimension if more systems such as shared-ride taxis using non-unionized labour are set up. Therefore, given these institutional factors together with the higher transit demands related to more compact land use patterns in large cities, paratransit has a greater chance to flourish in low-density communities, in small cities, and in rural areas in Canada than in the larger cities where the transportation systems are more structured.

There are a number of regulatory issues, some of which are related to the size of community served and others which are related to the technology. For example, many of the current transport systems designed primarily for the use of the elderly need to be modified to serve handicapped persons. This includes taxi systems that are unable to accommodate wheelchair users and small bus and van systems where vehicles are not equipped with ramps or lifts. It is not clear whether such issues will be resolved by market forces or by government regulation.

6.1 Small Communities and Rural Areas

There are two basic services that can be used for public transportation in the small communities and rural areas. These include taxi systems normally using conventional automobiles and small bus and van systems often equipped with wheelchair accommodation. Some communities may have more than one type of these services in effect. The taxi systems are often subsidized for the elderly and the handicapped.

Transportation services for the elderly and the handicapped (E & H services) are delivered in a great variety of ways in small communities and rural areas. A specialized E & H service may be provided through the following organizations:

- service clubs,
- senior citizen associations,
- social service agencies,
- private societies,
- handicapped associations,
- community action groups,
- municipal operation or contracts,
- institutions (hospitals).

Transportation service policies are usually a reflection of the organization delivering the service. It is not surprising that senior citizens associations tend to develop systems that primarily service the elderly, while community action groups tend to respond to broader needs.

Service policies include both eligibility criteria and system characteristics. Typical service policies include:

- eligibility criteria and priorities,
- trip priorities,
- pricing policy,
- hours and days of service,
- service area.

The operating staff for E & H systems include volunteers, part-time employees, full-time employees, and combinations of the foregoing. Often the vehicles are being dispatched from public service offices at no administrative cost to the system. Drivers may be involved in maintenance of vehicles in small systems. Many systems utilize volunteer dispatchers. Social services offices are frequently used as dispatch centres. Senior citizens often answer the telephones.

Taxi systems in the small communities are able to integrate subsidized taxi services and generally cater to the elderly and the handicapped without adding staff. The taxi drivers usually try to be in the areas that need service at a particular time so that dispatching is simplified. For example, if a particular senior citizens home generates trips at regular times, taxis will wait there for trips. This reduces the demand on the dispatching facilities.

6.2 Medium-Sized Communities

The most troublesome issues in medium-sized communities at present appear to be both financial and organizational. As the demand on special services for the handicapped increases, urban communities operating parallel bus and van services for the handicapped find the cost to be very high in comparison to their transit system costs. The high cost also appears to result in gradual withdrawal of non-profit social organizations from the role of providing special transit service for the handicapped. For example, the B.C. Lions Society discontinued its involvement in adult services in the Vancouver area in spring of 1981, as did the Edmonton Handibus Association. Each time a change of organization occurs, the new operator has to go through the learning process all over again. There is a recognized need to streamline contractual arrangements to ensure that there are no undue service disruptions or deterioration when turnover of operators occurs.

There appears to be a major difference in the way in which special services for the elderly and handicapped can be efficiently dispatched, depending upon the size of the community being served. Up to a population of about 200,000 persons, such systems can be operated reasonably well by manual dispatching with electronic data processing of records in the larger communities. In communities with populations above 200,000 persons, the manual dispatching systems become cumbersome. At present there is a substantial search underway for more cost-effective, automated dispatching systems.

6.3 Large Urban Centres

Some degree of computerization is inevitable in paratransit operations for large urban centres in this electronic age. Computer-assisted dispatching, electronic data recording, the sorting of subscribers' requests, and routine data management using micro-computers will become more prevalent.

The Transportation Development Centre of Transport Canada has been investigating computer scheduling and routing for the larger E & H systems. The objective of this research project was to develop an advanced computer model that could be used to automatically schedule and route special transit services for the E & H travel market. The proposed model was intended to interface with the wide variety of data bases already compiled by transit operators across the country. These data bases normally include such information as origins and destinations of passengers, time of pick-up and drop-off, travel distances between pick-up points, travel times at various periods of the day, and equipment available. The model would integrate this information with demands for new service requests or cancellations and provide automatic scheduling and routing.

Researchers are to test the model in four Canadian cities of different sizes and prepare a user's manual. The route coding for two cities, Montreal and Sherbrooke, Quebec, has been completed. Coding for routes in Ottawa and Toronto is well underway. The essential algorithms for the model have been defined. Researchers are now calibrating the algorithms and defining the optimum program for each route.

Similar applications of computer-assisted scheduling and routing are being investigated for Vancouver, British Columbia, and Edmonton, Alberta. In these cities it is proposed to have a central brokerage agency handle the routing and scheduling for a variety of individual service operators.

(a) The Brokerage Concept: Brokerage implies that the agency dispatching the service is not necessarily the vehicle operator. This is common with taxi firms where the vehicles are owned by individuals and dispatched by a broker. Since the level of service to the users, the overall service cost, and the productivity of the system is mainly dependent upon the efficiency of the dispatching centre, the trip broker, in effect, would become the system manager. If the broker was under contract to a city or was a city employee, then the broker would be responsible to the city to use the most appropriate and cost-effective mix of service providers.

(b) Automated Dispatching: At present there are three types of dispatching systems under development. These include the more traditional zone-based systems similar to those in operation in automated taxi dispatching systems (Blue Line Taxi in Ottawa, Diamond Taxi in Montreal, and Co-op Taxi in Edmonton) operating on mainframe and "mini" computers. A second type of system uses clustered micro-computers, with a pre-coded user registration file. This is the HAGI system being considered by BC Transit. A third type of system is the on-line/real time, interactive, integrated system being developed in Toronto.

6.4 Taxi Deregulation

Most urban municipalities in Canada have some form of taxi regulatory bylaw and/or licensing control of taxis. In the past, the numbers of new taxis allowed to operate in the larger cities have often been based on population growth; for example, a ratio of one taxi per 1,000 persons. Where these ratios have applied, competition has been limited and the price of a taxi licence, changing hands privately, has been very high (typically in the \$35,000 to \$50,000 range). This situation has not always worked in the best interest of the consumer.

Recently, both provincial and municipal governments have become interested in taxi deregulation. This has taken the form of removing the restrictions on the numbers of taxis in service and the types of trips that can be accommodated. Examples of deregulation are to be found in Alberta, where the licences are not restricted, and in Quebec, where the Ministry of Transport has taken steps to eliminate regulatory obstacles which prevent taxi companies from offering "more diversified" (paratransit) services.

6.5 Labour Issues

Organized labour is taking an increasing interest in the attempts of transit management to replace higher-cost fixed-route bus services with lower-cost taxi feeders. Less attention is being paid to the substitution of taxi services for the elderly in place of the more expensive lift-equipped vehicles and services for the handicapped. The least sensitive applications of paratransit services are those that are either operated by transit union labour or those which pay "union scale" to their employees, who may or may not be in a union. Both the Amalgamated Transit Union (ATU) and the Independent Canadian Transit Union (ICTU) have opposed the use of taxis as a substitute for conventional transit.

6.6 Insurance for Ridesharing

Insurance for ridesharing has not generally been a major constraint to implementing services. In most provinces, 'no fault' insurance is available based on the primary purpose of the vehicle. In British Columbia, for example, the vehicle would have to be insured for travelling to and from work or school. This coverage is not subject to additional penalties unless the vehicle is used for commercial purposes. In the Province of Quebec, legislation was introduced in 1978 to effectively remove the constraint resulting from high insurance costs.

7. ANALYSIS AND CONCLUSIONS

As rapid expansion took place in urban areas in the 1960's and 1970's and a more vocal and affluent society demanded higher standards of service, these fixed-route transit systems often ceased either to be economic or to provide good service to the lower density suburbs. It became very expensive to provide good area coverage for population densities below 2,000 persons per square kilometre. Travel times increased when arterial streets became congested and as neighbourhoods became isolated in a maze of crescents and cul-de-sacs. Handicapped persons found it difficult to live in such areas because of the lack of easily accessed public transportation.

Transit planners of the 1970's became interested in other types of transit services that had the potential to better serve the low density suburbs. These services included dial-a-bus systems, shared-ride taxi-transit, and a range of carpooling and vanpooling schemes. These less conventional forms of public transportation became collectively known as "paratransit" and the systems using the telephone for access to service as "dial-a-ride services".

Experience in Canada with paratransit service has demonstrated that:

- The dial-a-ride type of system can provide a good exclusive or parallel level of service for the elderly and the handicapped, providing accessible vehicles are used.
- Dial-a-ride is financially viable for certain transit applications where the demand is limited in any community, but particularly in small communities and rural areas.
- Interventions in taxi regulation can broaden the scope of taxi services and generate the production of new, more accessible vehicles. The major constraints to expansion of taxi services are the rate at which accessible vehicles can be obtained for the handicapped market and the development of accountable fare subsidy mechanisms. The future potential for taxis to replace or supplement a wide range of transit and paratransit services is very substantial.
- Paratransit feeder services must be sold to transit unions on the basis that the marketing of transit services is beneficial in the longer term when growth in demand inevitably requires fixed-route buses.
- Work-based ridesharing is likely to be the easiest system to implement, however incentives for general ridesharing including reserved parking, removal of tolls and universal no-fault insurance programs have been beneficial. Benefits include: more efficient use of parking investments; enhancement of transit usage; lower

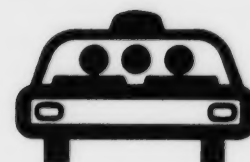
cost alternative to rural bus service; marketing tool for industry; enhanced labour relations.

- One of the most effective ways to ensure that special systems for the elderly and handicapped are implemented is to provide dedicated "seed money" and allow the communities to design their own systems with a minimum of interference by senior governments. Any over-regulation of such services tends to inhibit local initiatives.
- For those segments of the handicapped clientele who can use them, taxi services are much more cost-effective than dial-a-bus services.
- The cost-effectiveness of large-scale applications of special services for the handicapped are limited by both organizational and technological constraints. The most promising concept at present for the larger cities is that of a brokerage centre directly responsible to the City for coordinating all services using the latest in computer systems for both data management and dispatching. The major benefit of a brokerage system is that it allows existing transportation resources to be used for other purposes. The marginal costs are less than those for exclusive, dedicated services, because the capital amortization costs can be spread over a larger volume of business and little or no additional administrative overhead is required by the service operators. With the current emphasis, by all levels of government, on privatization, the brokerage concept will likely emerge as a preferred way to deliver transportation service to the elderly and handicapped, particularly where a mix of service providers must be coordinated. Applications are likely in most cities of 500,000 or more in population.



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PARATRANSIT IN CANADA – A REVIEW



FINAL REPORT
prepared for

TRANSPORTATION DEVELOPMENT CENTRE

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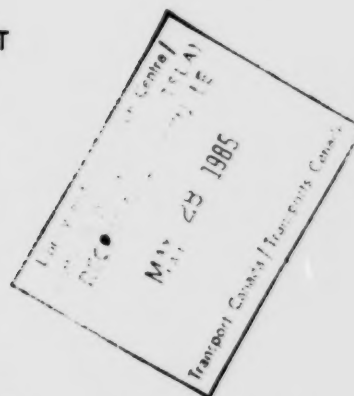
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March 1985

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The contents of this report reflect the views of the Contractor and not necessarily the official views or policies of the Transportation Development Centre, Transport Canada. Where references are not quoted, the statements in the report reflect the experience of the project team.

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17. Abstract This report provides a review and analysis of current paratransit applications in Canada. Paratransit includes demand-responsive bus and shared-ride taxi-transit services, special transportation systems for the physically handicapped, and ridesharing programs. The report provides a review of innovative technology, a discussion of current trends in regulatory and service policy changes, and a breakdown, by province, of funding policies for transportation for the handicapped. The report also includes a review of the following: - The role of taxis, with specific references to experience in Alberta, British Columbia and Quebec; - Current federal and provincial ridesharing programs; - Systems for the handicapped in small communities and rural areas; and, - Current issues and constraints in the implementation of paratransit services.					
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1. INTRODUCTION

1.1 Background

Canadian paratransit services have their origins in the demand-responsive dial-a-ride transit applications of the late nineteen-sixties and early nineteen-seventies. When interest in dial-a-ride systems peaked, there were some eighteen (18) operating systems in Canada. With the exception of the systems in Edmonton, Alberta, and in Pickering, Ontario, most of the dial-a-ride transit services using vans and small buses have since been discontinued. Dial-a-bus services in Ottawa, for example, have been replaced by route diversion techniques. (See Section 2.1.1 of this report.) Two systems using taxis are still in operation. These are located in Peterborough, and in Welland, Ontario.

The Canadian dial-a-ride systems generated interest in the marketing value of paratransit. Some systems were so successful in building up transit usage that the increased demand (from three (3) rides per capita, annually, to six (6) rides per capita, in Regina, for example) permitted the substitution of fixed-route transit. Others generated interest in doorstep service for the elderly and the handicapped (E & H). Still others that were unsuccessful led to a search for alternate strategies such as ridesharing that might work better in low-density areas. The fact that, with few exceptions, the dial-a-bus systems tended to be costly for public transit systems to operate (typically, \$3.00 per ride versus \$1.00 per ride on conventional transit) led to a greater interest in privatization, and particularly the potential for shared-ride taxi services.⁽¹⁾

There seemed to be a transitional period in urban growth where demand-responsive services could serve small communities, areas of low density, and periods of low demand density prior to the implementation of conventional transit services. Service designs tended to be site specific, and what worked well in one community was not always successful in another. Considerably more intensive management was required for the larger dial-a-ride transit systems.

With few exceptions, Canadian transit services for the handicapped have developed as multi-purpose transit systems in the very small cities and parallel services in the medium to large cities, rather than a program to retrofit the existing transit vehicles. The number of these special exclusive transit services has increased substantially during the past five years.

After fifteen years of experimentation, paratransit is an accepted mobility option in Canadian transportation planning. Hundreds of ridesharing projects have been implemented as well as hundreds of exclusive and parallel paratransit systems to serve elderly and handicapped passengers.

1.2 Agencies Interested in the Review

The federal government has a substantial current interest in paratransit activities. Within Transport Canada, the Transportation Development Centre (TDC) has a "long-term systematic effort in research and development (R & D) underway to bring about innovations and improvements in the transportation system. Emphasis is placed on R & D to achieve a higher level of transportation safety and efficiency as well as to ensure accessibility for all Canadians, including the elderly and the disabled."⁽²⁾ Since TDC acts as an in-house consultant and carries out its R & D program in collaboration with other components of Transport Canada, other federal government departments, provincial governments and the transportation industry, TDC has a far-ranging impact upon transportation systems and technology.

Within Energy, Mines and Resources Canada (EMR), support is being provided for ridesharing programs. These programs are being handled through the Energy Conservation and Oil Substitution Branch of the Conservation and Non-Petroleum Sector.⁽³⁾

1.3 Purpose and Scope of the Review

The purpose of this review and analysis of paratransit applications is to provide a current overview of Canadian experience to the R & D community. The scope of the review includes all the forms of paratransit described in Section 1.1 above.

The balance of the report is organized as follows:

Chapter 2 contains a discussion of the current trends in the application of a wide range of paratransit techniques.

Chapter 3 describes current funding and service policies and systems developed to accommodate the elderly and the handicapped.

Chapter 4 describes the development of an accessible taxi to serve those persons using wheelchairs.

Chapter 5 contains a discussion of current ridesharing programs and experience with ridesharing throughout Canada.

Chapter 6 provides a discussion of the current institutional and regulatory issues in rural areas and in small, medium-sized, and large urban centres.

Chapter 7 presents an analysis of current paratransit experience in Canada and the conclusions of this study with respect to the future of paratransit applications.

2. TRENDS IN PARATRANSIT SERVICES

2.1 Publicly-Operated Transit Systems

At present, there are three generalized forms of paratransit service in publicly-operated transit systems. These include: taxi feeder contracts, dial-a-bus systems and shared-ride taxi-transit systems. All of these applications provide a demand-responsive service similar to the dial-a-bus systems implemented in some eighteen (18) Canadian cities during the nineteen-seventies.

Regina's Telebus System, implemented in 1971, was typical of the dial-a-bus applications.(4) It utilized small vehicles in the 18 to 30 passenger range, manually dispatched by two-way radio. Users could subscribe in advance or telephone for service. Dispatching was supported by a computer file of regular users. A range of services were provided beginning with feeder services to fixed-route buses and other destinations when demands were sufficient. Fare premiums of about 30 percent were charged. After ten years of service and daily volumes of passengers in the 3000 to 4000 range, the Regina Telebus service was replaced by fixed-route buses in 1981.

The dial-a-bus transit systems of the early nineteen-seventies addressed a specific problem of serving areas and periods of low transit demand. Typical conditions for the successful implementation of dial-a-bus included the following:

- Transit demand densities of less than 20 trips per square kilometre (50 trips per square mile).
- Transit vehicle productivities of about 18 trips per vehicle hour (typically 6 trips @ 20-minute intervals, or 9 trips @ 30-minute intervals).
- Average trip lengths of 4 to 8 kilometres (8 to 16 minutes).
- No competing fixed-route transit services.

2.1.1 Dial-A-Bus Transit Systems

Currently dial-a-bus transit systems for the general public are operated only in Pickering, Ontario, and Edmonton, Alberta.

(a) Pickering System: Canada's first dial-a-bus system was implemented by the GO-Transit system in the urban subdivision of Bay Ridges, Ontario, which was located within Pickering Township.(5) Bay Ridges is now a subdivision of the Town of Pickering, a small residential community of 37,000 persons, some 32 km east of downtown Toronto. (See Figure 2-1.) Most of the residents of Bay Ridges moved into the community with the knowledge that they would have to rely on the automobile for virtually all trip purposes. The GO-Train had started in service in May 1967. Bay Ridges was chosen for the initial Ontario dial-a-ride experiment mainly because there was no existing bus transit service in the community that would interfere with the monitoring and operation of the experimental service. Public response to the dial-a-bus service was encouraging and the system was found to be cost-effective during periods of low demand.

The system was taken over by the Township of Pickering in January 1973. On January 1, 1974, the urbanized area became incorporated into the Town of Pickering and the Town became responsible for the service. Later, in August 1980, a fixed-route loop shuttle service was introduced in Bay Ridges, and in October 1981 all dial-a-bus services were replaced with fixed-route bus service. The results were mixed. Some bus routes were reasonably well accepted; others were not. As a result of public pressure, dial-a-bus service during off-peak hours was reinstated in July 1982.(6) Currently, the dial-a-bus system operates from 8:10 a.m. to 4:30 p.m. Monday to Friday and from 7:20 p.m. to 1:30 a.m. Monday through Saturday. Service does not operate on Sundays or holidays. The dial-a-bus service is essentially a feeder service that connects with local fixed-route buses and express services to Toronto.

(b) Edmonton System: In late April, 1983, the Edmonton City Council revived the issue of paratransit services for the general public by requesting the Transportation Management Department to study the efficiency and effectiveness of implementing paratransit services by Edmonton Transit. The study looked at replacing regular bus services with off-peak paratransit during Monday to Saturday at night, and all day on Sundays and holidays in five areas: Kaskitayo, Millwoods, Clareview, West Jasper Place, and Riverbend. These areas had a combined population of about 75,000 with estimated annual passengers of 312,000 under the specified time periods.

The study examined 12 alternatives. Eight of the alternatives involved contracting for some variation of shared-ride taxi with the private sector. The remaining four alternatives were to provide dial-a-bus service operated by Edmonton Transit. The hours of operation were to be, Monday to Saturday, from 7:00 p.m. to 1:00 a.m., and Sundays and holidays, from 6:00 a.m. to 1:00 a.m. One dial-a-bus application was chosen.(7)

It was decided that initial implementation on November 13, 1983, be restricted to the area with the lowest transit ridership to minimize any potential operating problems. Experience gained from this would then be applied to the other four areas or elsewhere in the city. The area which met the above major condition was Riverbend, which had an estimated ridership of 12 passengers per hour.

The service was operated between the Riverbend Community and the Southgate Transit Centre, a major transfer point (Figure 2-2). The route consisted of two main parts. The first portion provided regular fixed-route bus service between the major transfer point (Southgate) and a node at the periphery of the community (Whitemud Drive/53 Avenue intersection). The second portion offered dial-a-bus service from the node into the community utilizing a variable route (combined routes of previous regular service) and a fixed schedule.

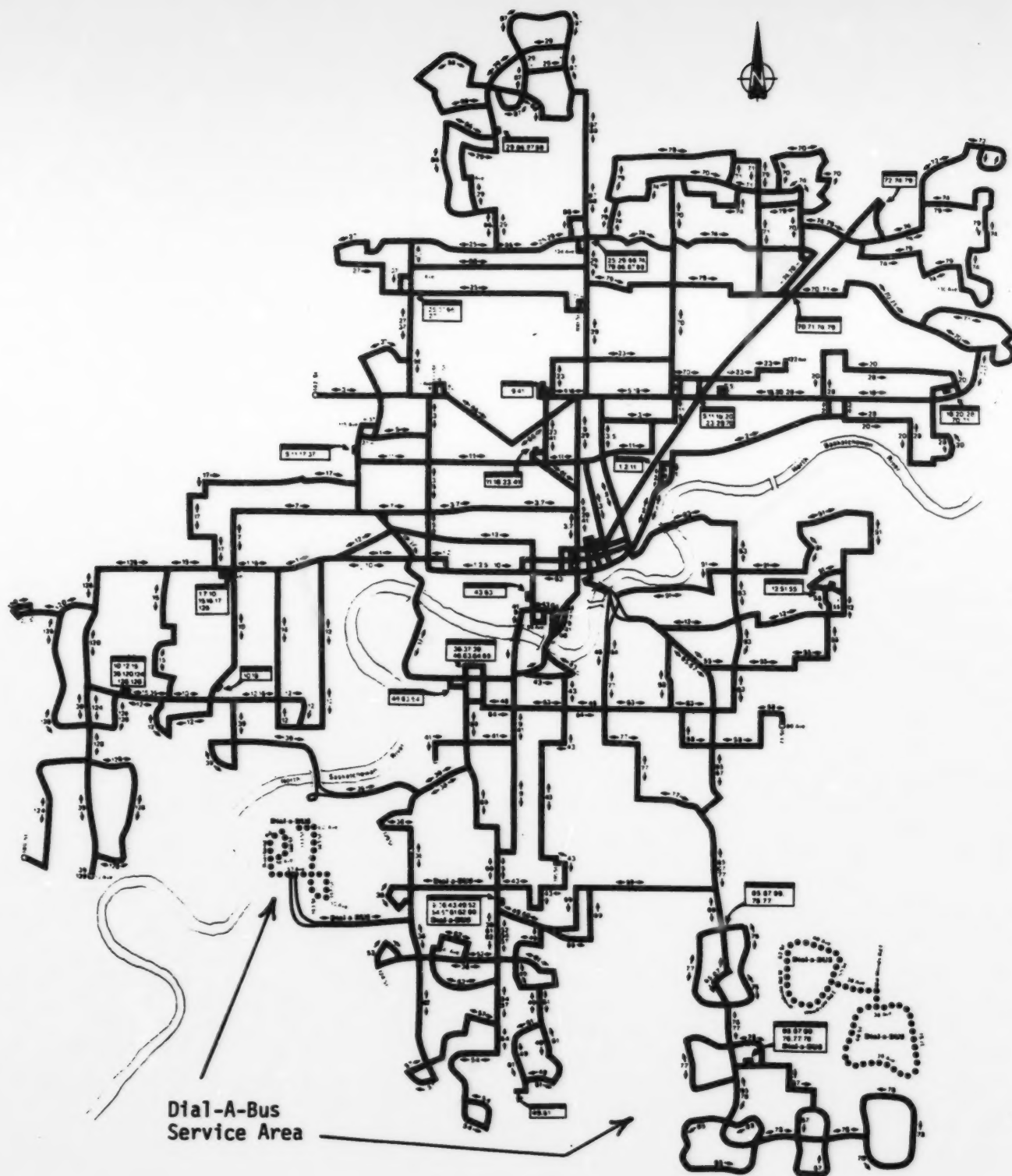


Figure 2-2 Location of Edmonton Dial-A-Bus Service
(Courtesy Edmonton Transit)

Statistics for the system are as follows:

Implemented:	<u>Riverbend</u>		<u>Millwoods</u>	
	November, 1983		September, 1984	
	Before 60 min.	After 30 min.	Before 60 min.	After
Service Interval:				
Annual Vehicle Hours	4,290	2,860	7,488	5,720
Annual Vehicle Kilometres	85,800	57,200	149,760	114,400
Annual Ridership	34,320	34,320	51,480	51,480
Annual Operating Cost	\$117,460	\$86,433	\$205,021	\$168,121
Annual Revenues	34,320	34,320	51,480	51,480
Annual Subsidy	\$ 83,140	\$52,113	\$153,541	\$116,641

(c) Ottawa System: The Ottawa dial-a-bus application is called "The New Tele Transpo" service operated by O.C. Transpo on route #174 serving the Riverbrook and Knoxdale subdivisions in the southeast area of the City. The service is provided by demand-responsive fixed-route buses that divert off their regular route to serve the low-density subdivisions when requested. O.C. Transpo intends to use this technique where ridership does not warrant a regularly scheduled route.(8) The service area is shown in Figure 2-3. Statistics on the service were not currently available.

2.1.2 Taxi Feeder Contracts

BC Transit is currently experimenting with a taxi feeder to a fixed-route Metro Transit service during periods of low demand on the Capital Region Transit System (Victoria, British Columbia).(9) A decision to introduce taxis on the 78-North Saanich rush-hour bus route (see Figure 2-4) in Victoria was based on two objectives:

- to reduce costs on what had been a poorly patronized bus route;
- to test paratransit concepts to see if taxi-bus operations might have general application in other systems or services funded by BC Transit.

Patronage on the bus route had been poor. Total daily ridership on four trips was only 10 to 15 passengers, most of whom rode free or at concession fares. Because of the poor revenue/cost ratio, BC Transit proposed to substitute a small passenger van on the route in an effort to reduce vehicle costs. However, no capital funds for a van were available. As an alternative, BC Transit called for proposals from private bus operators and taxi operators to operate the service under contract. A decision to contract with a local taxi firm was made and the taxi-bus service began operation in August 1983.

The taxi-bus service operates as an exact substitute for the former bus service. The same schedule is followed as before - no deviations from the fixed route are permitted. A small dashboard sign in the window of the taxi indicates that the taxi is operating the "78-North Saanich" route. Passengers are picked up on a "flag stop" basis. There are no bus stop posts or signs along the route except on a short portion where the taxi-bus follows a common routing with a regular bus service.

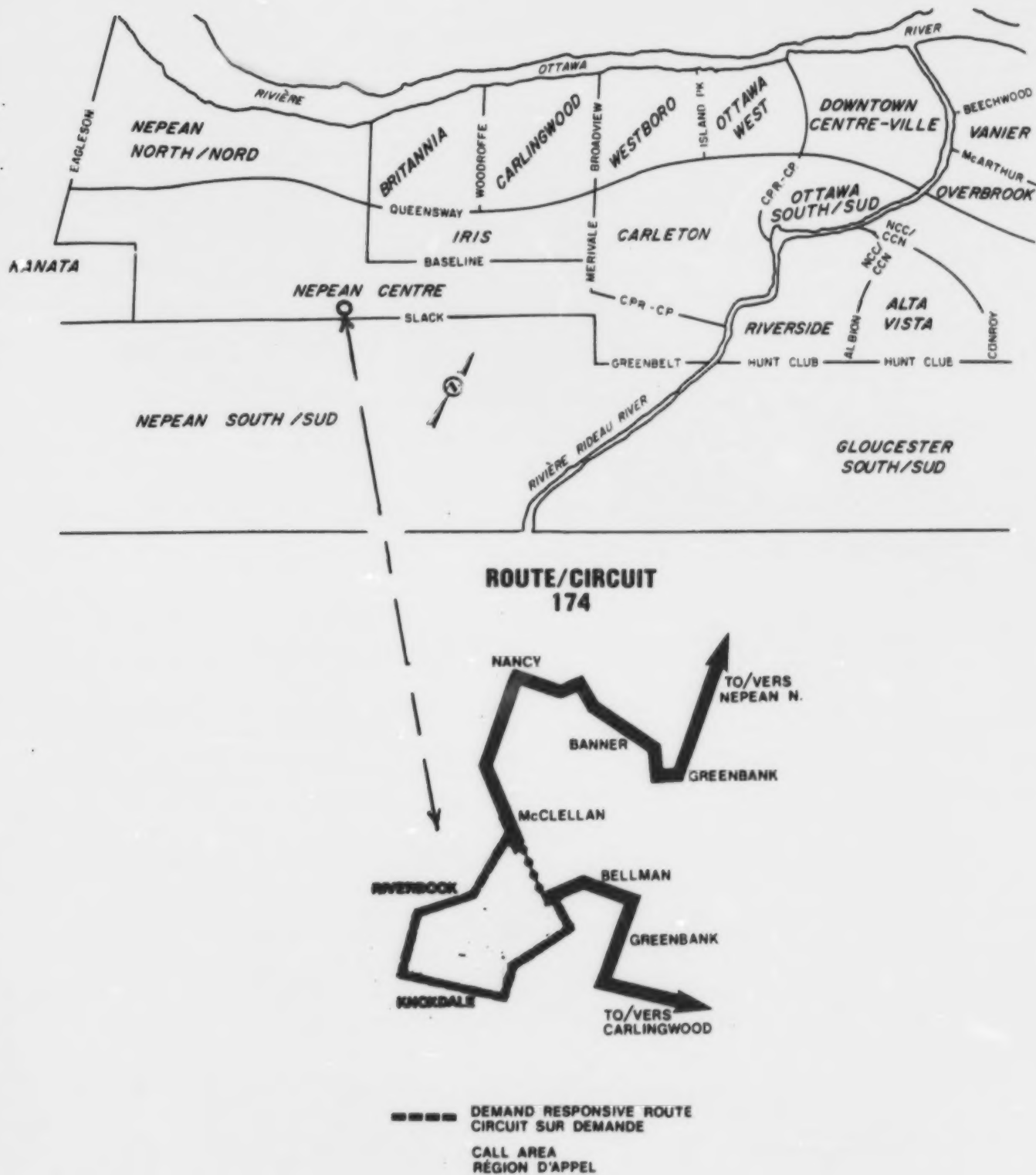
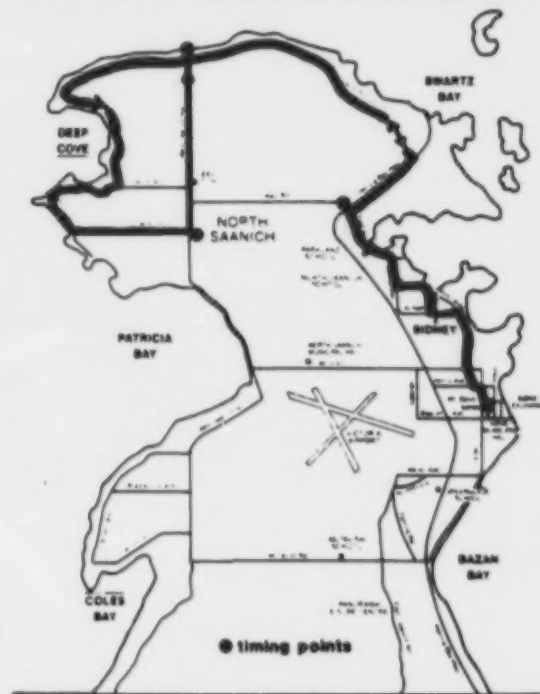


Figure 2-3 Location of Ottawa Route Diversion Service
(Courtesy OC Transpo)



78 North Saanich



Starting July 16, 1984 the 78 North Saanich 'Taxi Bus' route will be changed to include the Deep Cove area as shown on the map. Schedule times will remain unchanged on the four trips daily, Monday through Saturday. As before, the service will be operated by Beacon Taxi of Sidney. Overload taxis will be dispatched as needed to prevent passenger pass-ups. Direct connections are provided on the 70 Pat Bay to and from downtown Victoria at the Sidney Exchange.

Figure 2-4 Location of Victoria Taxi Feeder Service
(Courtesy Tourism, British Columbia, and BC Transit)

Passengers boarding the taxi in the outlying area must present a valid Metro Transit transfer, pay the single zone cash fare, or present a valid pass honoured by Metro Transit. The taxi-bus operator retains all transfers and cash. No receipts are issued, but the operator marks the passenger tally on a record log.

The return taxi trips at present are on an "honour fare" system for passengers transferring to the Metro buses because Metro Transit operators have refused to accept transfers from the taxi-bus service because of a jurisdictional dispute between the bus operators' union and Metro Transit concerning the taxi-bus operation. The taxi company operates the service at a contractually agreed hourly rate paid by BC Transit. Against this agreed price the taxi company is required to deduct the cash fares received and bill BC Transit for the balance each month. There is no direct audit or control system, but BC Transit conducts routine ride checks to verify the approximate validity of the billings. BC Transit has identified three potential abuses of this system:

- Passengers may inform the taxi-bus operator that they are transferring to Metro Transit when they are not, thereby evading fare payment on the return trip.
- Taxi operators may pocket cash fares and falsify trip logs by reporting fewer passengers than actually carried.
- The taxi company may falsify trip logs by reporting fewer passengers than actually carried in an effort to increase its billing amounts.

BC Transit's spot checks indicate abuses are not occurring in any significant volume. One incident of a taxi operator pocketing fares was uncovered, but disciplinary action by the taxi company appears to have remedied that problem.

Statistics for the analysis of transit service based on the consultant's analysis of BC Transit data before and after the taxi feeders were used for the month of May 1984, are as follows:

	<u>Before</u>	<u>After</u>
Monthly hours of service	126	126
Monthly passengers carried	250	350
Monthly cost	\$5,670	\$3,920
Monthly revenues	205	286
Monthly subsidy	<u>\$5,465</u>	<u>\$3,634</u>

The Saanich taxi-bus service has been reasonably successful, however the labour dispute was placing constraints on the service. This included:

- Metro Transit operators' refusal to collect transfers issued by taxi operators.
- Metro Transit information staff's (not members of the bus drivers' union, but also unionized and sympathetic) refusal to provide telephone information or to print timetables advising potential taxi-bus users of the service.

- Metro Transit operators frequently were not waiting at meet points for the taxi-bus if it was late. Likewise, taxi-bus operators were not waiting for overdue Metro buses. It is possible that any animosity between Metro Transit operators and the taxi-bus operators was complicated by the tight schedules of each which leave little flexibility for making connections.

2.1.3 Shared-Ride Taxi-Transit Systems

Shared-ride taxi-transit services are operating in small communities in Ontario, Saskatchewan and Alberta.⁽¹⁰⁾ These include the following systems:

- Peterborough Trans-Cab, Peterborough, Ontario (since 1975);
- Battlefords Shared-Ride Taxi-Transit, North Battleford, Saskatchewan (implemented November 1978);
- Welland, Ontario, Taxi-Transit (since 1982);
- Vermilion, Alberta (elderly only since 1982);
- Pincher Creek, Alberta (elderly only since 1978).

(a) Peterborough Trans-Cab Service: The Peterborough Trans-Cab service is a shared-ride taxi-transit feeder service from two low-density subdivisions (0.3 to 1.3 persons/hectare) to the fixed-route conventional transit service serving the higher-density areas of the City. (See Figure 2-5.) It was operated as a demonstration project under 100 percent provincial funding from May 1974 through February 1975, when the City of Peterborough (population 61,000) assumed responsibility for the taxi-transit service.⁽¹¹⁾

Taxi demand and scheduling are controlled by the fixed-route bus service. Passengers are provided with doorstep pick-up to meet the schedule of the inbound buses and declare their intention to transfer to the shared-ride taxis when boarding the bus for their return trip. A premium of ten (10) cents was charged over the regular adult bus fare of sixty (60) cents in 1981. The City guarantees the taxi company the meter rate for each trip subtracting any fares collected. An audit control is provided by a separate taxi dispatch, taxi driver and bus driver log of trips provided.

Peterborough Trans-Cab demonstrates the use of shared-ride taxis as an effective and economic alternative to fixed-route services in low-density areas. Compared to a previous fixed-route feeder service, the Trans-Cab service improved the revenue/cost ratio from 8 percent in 1974 to 39 percent by 1980, and the deficit per passenger trip from \$2.34 in 1974 to \$0.72 in 1980.

(b) Battlefords Taxi-Transit: The Battlefords contains two urban communities: the City of North Battleford (population 14,000) separated from the Town of Battleford (population 3,500) by the North Saskatchewan River. The distance between these communities is approximately five kilometres. (See Figure 2-6.)

A hybrid bus/taxi system was implemented in November 1978. This economical service provided a high-capacity bus on a fixed schedule for the long commuter trips and shared-ride taxis for the shorter intra-city trips. The bus portion of the system accommodated the inclusion of special

Trans-Cab

1. Check the map to see if you live in a Trans-Cab area. (It's marked in pale yellow on your map.)
2. Dial 748-4443 at least an hour before you'd like to be at a bus stop.
3. For 15 cents more than the regular fare a taxi will pick you up no later than five minutes before your departure time.
4. The taxi drops you at a bus stop that will get you downtown pretty quickly. It'll be on either Route 4 (Jackson Park), Route 5 (Central Loop) or Route 8 (Monaghan).

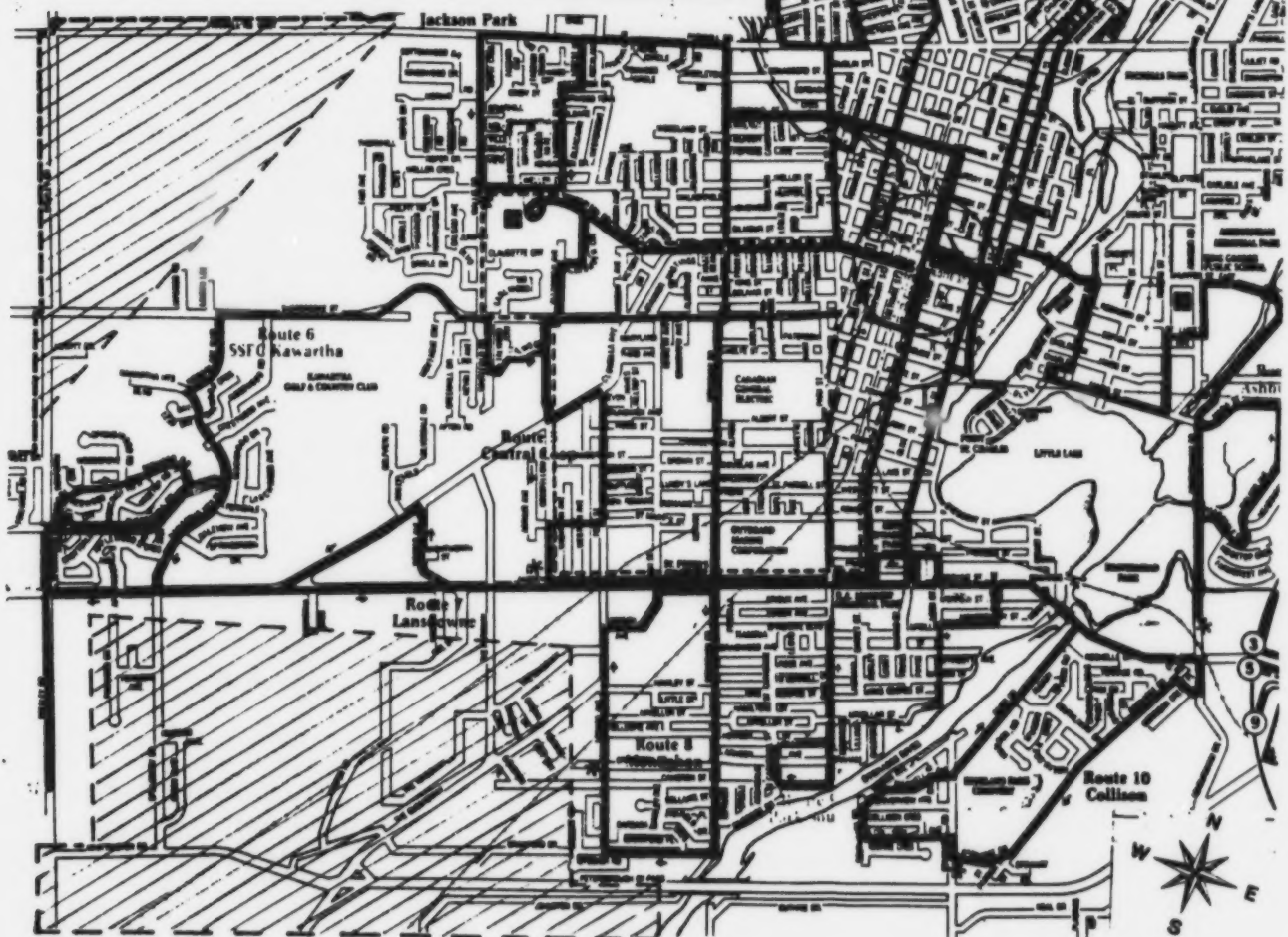


Figure 2-5 Peterborough Trans-Cab Service Area
(Portion of transit route map, courtesy City of Peterborough)

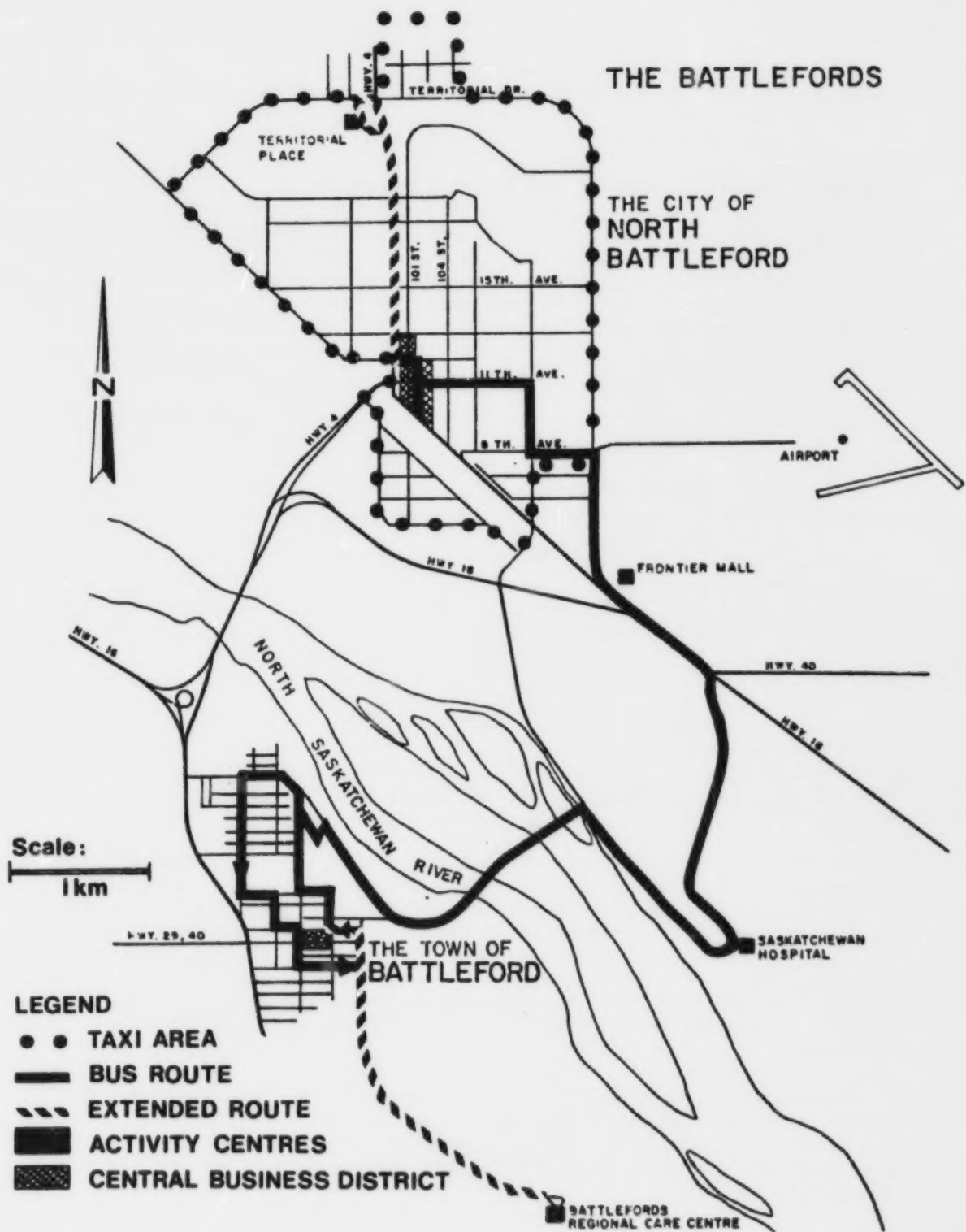


Figure 2-6 Battlefords Taxi-Bus Service Area

lift-equipped vehicles to serve handicapped persons at lower cost and with greater flexibility than in the case of a prior fixed-route transit system.

Three contracts were established initially: one for the taxi feeder service, one for the fixed-route bus, and a third for transit management services. Later, the manager became a City employee. Contracts were administered by the Clerk of the City of North Battleford. The 1981-82 ridership was about 60 percent higher than that for the previous fixed-route bus service. The revenue/cost ratio is about 40 percent for the bus service based on \$1.00 fares and about 60 percent for the taxi services based on \$1.25 fares. Buses are owned by the community. This cost-effective system is currently being expanded.(12)

2.2 Vehicle Guidelines

Three basic classes of vehicles have been used in Canada to meet the transportation needs of the disabled. These classes of vehicles include:

- small buses equipped with wheelchair lifts;
- vans equipped with wheelchair ramps or lifts;
- mid-sized and larger automobiles, driven privately or used as taxis.

Systems operated by government institutions in most communities are using a variety of lift-equipped vans and buses to provide service to the elderly and the handicapped. Some communities prefer to use vans with rear access ramps for ease of loading in narrow lanes where side loading is a problem. Most of these systems have the capability of serving both ambulatory and non-ambulatory persons using the same vehicle.

Systems operated through contractual arrangements with private institutions or enterprise use a greater variety of vehicles. Such systems may use buses, vans, private automobiles and taxis. Typically, the smaller communities which have more limited resources and service demand are using subsidized taxis.

In 1981 the Transportation Development Centre, Transport Canada, initiated a study to review the needs of paratransit service operators in the context of providing transportation to the mobility handicapped.(13) Specifically the environment in which these services would operate was investigated with a view to providing guidelines to regulators and operators which would facilitate the introduction and successful operation of special vehicles. In addition, an extensive review of current and proposed paratransit vehicles was carried out to produce a set of desirable characteristics and specifications for the guidance of vehicle developers.

The project was carried out by consultants under the sponsorship of the Transportation Development Centre of Transport Canada and RTAC's Transportation Technology Technical Committee. The principal authors of the report were the consultants with final editing and format provided by the RTAC secretariat.(14)

2.3 Overcoming Institutional Constraints

Paratransit has been described by one author as the "consumer's delight and the regulator's nightmare".(15) In Canada "paratransit" remains a relatively unfamiliar term to much of the public, including many of the agencies which would regulate its operation, the potential operators of the services and current and potential vehicle developers. It is encouraging to note that the Canadian Urban Transit Association (CUTA) is becoming more interested in paratransit systems and services, reflecting the interest of its operating membership. CUTA has developed a policy paper on transportation for the handicapped (see Section 3.0) and admitted the first operating member of a handicapped system at the fall meeting in November, 1984.

2.4 Evaluating Benefits

Attempts have been made to develop more appropriate service indicators to measure the productivity and cost of paratransit services. There has been an obvious need to include "level of service" considerations more explicitly. Calculations based on the usual transit financial considerations such as the cost per passenger mile make some forms of paratransit poor in comparison with conventional transit systems because the two do not provide the same level of service. Paratransit services can be shown to be a viable transit option if evaluated on the basis of the cost of an equivalent transit service. Such an evaluation has been made in the City of Regina in the past (16) and is being considered by transit planners in British Columbia and Alberta.(17)(18)

3. ACCOMMODATING THE ELDERLY AND THE HANDICAPPED

Canadian transit services for the handicapped have generally developed as multi-purpose systems in the very small cities and parallel services in the medium to large cities, rather than a program to retrofit existing transit vehicles. The number of these special exclusive services for the handicapped has increased dramatically during the past five years. The 1977 edition of the national "Guide for Travellers with Special Needs" listed fifteen (15) systems in the major cities. The 1981 edition of the travel guide listed eighty-five (85) systems.(19) Table 3-1 provides some typical statistics for these systems for a range of different-sized urban communities in Canada. Currently the consultants estimate that there are approximately 300 systems in operation in Canada. More than 100 of these are located in the Province of Alberta.(20)

Private/public partnerships operating systems for the handicapped exist in Alberta, British Columbia, Quebec and Saskatchewan. In Saskatchewan, parallel services are provided by non-profit agencies in the larger communities and by private enterprise in the small communities. In Manitoba, Quebec and the Yukon, parallel services are operated by the public transit system. In Ontario, the trend is toward operation by non-profit agencies and public agencies. In the Maritimes, there is a mix of private, public and non-profit agency participation. In many communities more than one service is available, including both subsidized and non-subsidized taxi services.

The Canadian Urban Transit Association (CUTA) issued a policy paper on transportation for the handicapped in May of 1980. This paper has served as a guideline for municipal transit planners. The policy paper includes the following statements:

- That the federal, provincial and municipal governments provide adequate funding for the provision of demand-responsive special vehicle services for individuals who are restricted to wheelchairs.
- That subsidized taxi or regular automobile services be made available to supplement these demand-responsive special vehicle services for those disabled individuals who do not require wheelchairs but are not able to use conventional transit facilities.
- That Canadian transit systems be provided with subsidies to improve the accessibility of the existing transit facilities to those who can only with great difficulty presently use them, for instance by providing special seating, handrails, additional escalators (in systems that have subways), and equipment for making stop announcements.
- That the feasibility be studied of subsidizing specially-equipped automobiles for those disabled individuals who would be able to drive them.
- That CUTA members take a lead role in the development of a standard design for vans for the handicapped, in setting up special services in their communities, and in providing direction to any private contractors who are providing transportation services to the handicapped.

<u>City</u>	<u>Revenue Vehicle Kilometres</u>	<u>Total Vehicle Kilometres</u>	<u>Revenue Passengers Carried</u>	<u>Total Passengers Carried</u>	<u>Revenue Vehicle Hours</u>	<u>Passengers Per Hour</u>
1. Edmonton	n/a	n/a	190,235	190,235	94,286	2.02
2. Victoria	248,039	248,039	27,600	27,600	13,957	2.00
3. Regional Municipality of Peel	177,833	356,899	35,113	37,345	17,268	2.04
4. Quebec City and Area	n/a	253,286	65,982	65,982	n/a	1.90
5. Ottawa- Carleton	1,765,324	1,765,324	172,014	172,014	74,510	2.31
6. Town of Oakville	n/a	64,700	9,893	9,893	n/a	2.80
7. Hamilton Wentworth	n/a	581,026	102,890	102,890	32,000	3.22
8. Winnipeg	493,198	493,198	65,674	65,674	32,016	2.05
9. London	n/a	304,850	39,152	39,152	19,821	1.97
10. Windsor	n/a	199,046	25,343	25,343	9,930	2.55
11. Montreal Urban Community	n/a	1,990,987	179,398	179,398	n/a	n/a
12. Ville de Laval	n/a	384,116	41,464	41,464	14,588	2.80
13. Area of Montreal South Shore	n/a	301,640	21,709	23,046	16,394	n/a
14. Toronto	n/a	n/a	273,662	273,662	181,757	1.51
15. Calgary	2,082,031	3,852,569	377,900	377,900	131,192	2.80
16. Vancouver	1,748,767	2,974,146	347,146	365,239	169,071	2.05

Source: 1982 CUTA Survey

Table 3-1 Characteristics of Transportation Systems for the Handicapped in Canadian Cities

- That CUTA members assist the taxi industry in the design of specially-equipped taxicabs capable of accommodating the needs of those disabled individuals who do not require special lift devices but are not able to use conventional transit facilities.
- That CUTA members assist service clubs and other organizations active in providing transportation for the handicapped by supplying technical information on vehicles, dispatching systems, operating costs, and available funding support programmes.
- That CUTA act as a clearinghouse of information on operator experience with respect to special services for the handicapped.

3.1 The Role of Taxis

Taxis have always been an important component of Canadian transportation services for the elderly and the handicapped, and are likely to become an even more important component in the future. In smaller communities and rural areas, taxi firms often provide the only public transportation service that is available. In larger communities, taxi services supplement the limited availability of special buses and vans operated exclusively for the handicapped. Transportation systems for the handicapped that are operated through contractual arrangements with government agencies usually include a taxi service component. Subsidized taxi services for both the elderly and handicapped are becoming common in small urban communities.

A growing concern over the high cost of transporting E & H passengers in small transit-type vehicles is resulting in a shift to greater use of taxis. This is occurring in the larger cities of Alberta. A major shift toward the use of taxis has occurred in Quebec.

In January, 1982, Transport Adapte du Quebec Metro Inc., a specialized transport service and a subsidiary of the Quebec City Transit Commission, introduced the use of taxis for transportation of disabled persons throughout the metro area.⁽²¹⁾ This new measure substantially changed the operation of the system. The reported results of these changes are most positive for the Corporation, its users and the taxicab industry. The taxi service is reported to have accomplished the following:

- Service refusals were virtually eliminated.
- Costs per passenger trip were reduced by one-third.
- Substantially reduced travel times.
- Advance reservation notice reduced from 24 hours to 8 hours.
- Ability to provide service at times requested.
- Reduced bus vehicle requirements, with subsequent reduced capital outlays.
- New sources of income for the taxi industry.
- Overall, users better served than by conventional transit service.

A majority of the Corporation's clientele, such as the visually and mentally impaired and those persons using manually-operated wheelchairs, are now transported by taxi. In addition, vehicles with ramps are used almost exclusively to transport users of motorized wheelchairs. In December, 1983, some 62 percent of the users were transported by taxis and 38 percent by modified vans. The Government of Quebec has recently proposed to broaden the role of the taxi industry in that province to permit taxi companies to offer new paratransit services.⁽²²⁾

The high cost of publicly-operated van and bus systems (typically double the cost of an equivalent taxi trip) will likely accelerate the current trend towards a greater use of taxis in transportation systems in the future.

3.2 Innovative Funding Policy for Small Communities and Rural Areas

The Province of Alberta has a unique Public Transportation Operating Assistance Grant (PTOAG) program.⁽²³⁾ All towns, villages, rural municipalities, municipal districts, and "special areas" have received \$2.00 per capita yearly since 1980 based upon the latest population figures derived from the municipal census. More than one hundred communities have used these funds to provide some form of paratransit service. The grant was increased to \$3.00 per capita in 1984.

The prime objectives of the PTOAG program were to provide assistance to communities where public transit was not available in two major areas:

- The development of specialized transportation services for senior citizens, the disabled and the handicapped.
- Subsidization or upgrading of existing transit services (i.e. taxi) in a municipality, for the benefit of senior citizens, the disabled and the handicapped.

The grant is working well and fulfilling its original objectives. The elderly and handicapped are receiving improved public transportation services, both where there were none previously and where services were present. Municipalities have demonstrated a great deal of initiative and employ a variety of applications specific to their local transportation needs, including subsidized taxis, lift-equipped vans and charter buses.

The benefits of the PTOAG program have been as follows:

- The grant enables seniors, disabled or handicapped persons to remain living in their own community, instead of moving to a larger community which has public transit.
- Through increased mobility the grant allows seniors and handicapped persons to remain in their homes as opposed to having to move to a senior citizen's lodge or nursing home.
- It finances arrangements for medical appointments, visiting friends, or participating in organized outings.
- It encourages community spirit and interaction between towns and rural areas.
- It encourages community spirit by providing seed capital for community programs which local service clubs can help support.
- A multiplier effect has often occurred when the impact of each dollar given under the grant has been multiplied through matching private contributions and volunteer commitments of community service groups.

3.3 Dual-Purpose Systems

Many communities with public transit systems have also contracted for parallel services using lift-equipped buses or vans for the handicapped. This has been necessary because of both the access and wheelchair storage space limitations of automobiles currently used as taxis. Current trends toward smaller-sized taxi vehicles indicate that these problems will be more

toward smaller-sized vehicles indicate that these problems will be more acute in the future. Many communities are too small for conventional public transit. Some of these communities have solved this problem by contracting for dual-purpose vehicles that can provide special service for the handicapped as well as conventional transit for the general community. An example of this type of service is Battlefords Taxi-Bus in Saskatchewan.(12)

3.4 Public/Private Partnerships

The use of public/private partnerships to operate systems for the handicapped is most apparent in Alberta and British Columbia. In other provinces, the special services are often provided by non-profit agencies or companies in the larger communities and by private enterprise in small communities. In the Province of British Columbia, BC Transit has substantial experience with transit contracts with private companies for small communities.(24)

3.5 Urban Funding and Service Policies by Province

The following sub-sections provide a brief description of the way in which special transportation services for the elderly and the handicapped are provided in each province and the related provincial funding policies. Table 3-2 on pages 25 and 26 provides a summary of the arrangements.(25)

3.5.1 Alberta

Provincial funding, in the form of an unconditional "Public Transit Operating Assistance Grant" through Alberta Transportation, assists in the cost of operating public transit services and special transportation services for the elderly and disabled. The only requirement is for the community to report annually as to the types of projects funded. Those cities that are operating a public transit system receive \$8.00 per capita plus \$3.00 for any special transit services for the elderly and/or the disabled that are provided. Smaller cities where conventional transit is not present and larger towns with a paratransit system receive \$3.00 per capita plus \$3.00 for transportation of senior citizens and the disabled. All other jurisdictions receive \$3.00 per capita for the transportation of the elderly and disabled.

3.5.2 British Columbia

The provision of all types of municipal transit services is the responsibility of BC Transit, a provincial Crown corporation. The provision of transportation services for the elderly and disabled falls under the Custom Transit Services program of BC Transit. In Greater Vancouver and Greater Victoria, BC Transit enters into two-party annual operating agreements with local transport operators who agree to provide a stipulated number of annual hours of service in a defined area and adhere to an agreed-upon annual service budget. In smaller communities, the municipality is also a party to these Custom Transit agreements. In communities which are too small to sustain conventional transit services, ambulatory and disabled persons may be served by a "paratransit" system.

Custom transit vehicles are usually purchased by BC Transit and then leased to operators. Capital expenditures for vehicles and equipment are

annualized either through lease arrangements or amortization, and are then subsidized as part of the annual operating costs. In some smaller communities, charitable organizations have donated vehicles for custom transit service.

In 1985, financial assistance was being provided for custom transit services in twelve communities and for paratransit service in another ten communities. Eligibility for the service is guaranteed for persons who are registered for the service and who are unable to use conventional public transit without assistance. Income and age are not considerations. By provincial Order-in-Council, the following groups are eligible:

- handicapped persons as defined under the Guaranteed Available Income for Need Regulations;
- recipients under the Blind Persons Allowances Act;
- those whose permanent or temporary disability, confirmed by a medical practitioner, is severe enough to prohibit unassisted use of transit.

Sharing of operating costs between the province and a municipality is based on user revenue/cost ratio targets ranging from 10 percent initially for exclusive service for disabled persons up to 30 percent for paratransit systems serving all needs. A special provincial revenue supplement equal to 25 percent of total custom transit service cost is provided to augment farebox revenues in Greater Vancouver and Victoria (20 percent in smaller communities). For custom transit, the provincial share of the "shareable deficit" ranges from 72.5 to 75 percent in the first two years, 69 to 70 percent in the third year, and 66.7 percent in the fourth and subsequent years of operation. There are also upper limits to the total amount of operating funds available from the province depending upon the type of service to be provided. At present these limits are about \$7.50 per capita for paratransit services and \$3.00 per capita for exclusive custom transit services for the handicapped. In addition, BC Transit shares up to 50 percent of the cost of demonstration projects.

3.5.3 Manitoba

Conventional transit and special services for the disabled are operated by the public transit systems in the cities. This program, called "Handi Transit", is managed by the Department of Urban Affairs. Capital assistance to the cities amounts to 60 percent for provincially-manufactured buses. The cities can receive up to 50 percent of the operating deficits. For example, Winnipeg receives a grant from the province at present of \$700,000 per year for the provision of transportation services for the disabled. Additional funds are available for conducting studies aimed at the implementation of new services.

The Department of Highways and Transportation manages the Program of the Transportation of the Mobility Disadvantaged in Rural Manitoba. In 1985, there were 22 rural communities participating in this program. The program requires a municipal initiative with technical support provided by the Province. The Province outlines the minimum requirements for vehicles, user eligibility and service levels. There is provision for a one-time start-up grant of \$6,000 plus capital grants of 50 percent to a limit of \$10,000. Operating grants are provided on the basis of 37.5 percent of operating costs to a limit of \$20,000.

3.5.4 New Brunswick

There is currently no specific legislation in this province regarding transportation of disabled individuals. The policy of the Province is that urban transportation is under municipal jurisdiction. Provincial assistance was being provided through the transfer of unconditional grants under the federal Urban Transportation Assistance Program (UTAP) up to and including 1983.

The first regular service for the disabled went into operation in 1981, in Fredericton. The service received federal funding for a vehicle under the UTAP program, with the balance being raised by community organizations. Grants were also received from the City of Fredericton. Operating and maintenance costs are subsidized by the Fredericton Transit System.

3.5.5 Newfoundland

At present, there is only one special transit service for the disabled operating in Newfoundland. This is an on-demand curb-to-curb service in the St. John's - Mount Pearl metropolitan area. This service provides the disabled population with special transit service for seven days per week. The service is operated and administered by a local service organization (The HUB) using vehicles which were provided and are being maintained by the provincial government. Funding sources are the municipal governments of St. John's and Mount Pearl, the provincial government, and a user charge of \$2.50 per one-way trip. The basis of eligibility for the special urban transit service is those persons who have difficulty using the regular transit service due to a physical disability.

3.5.6 Nova Scotia

Transportation for disabled persons in Nova Scotia is provided through the municipal agencies responsible for delivering public transit. Although there are several privately operated services not funded by government, most of the service is contracted for by the local transit commission or transit authority and operates as a parallel system using vehicles and equipment owned by the municipality.

The Department of Municipal Affairs provides an operating subsidy based on the population served (regardless of ridership) and capital grants of fifty percent of the cost of specially-equipped buses or vans, subject to agreement by the Minister. Capital costs may be reduced by federal assistance where available.

The 1985 provincial subsidy per capita served was \$1.15. Operating and capital funding levels for 1986-87 are budgeted at three percent over 1985-86.

3.5.7 Ontario

At year-end 1985, about fifty-two municipalities were provided a specialized transit service for disabled persons and were receiving provincial funding assistance through a program administered by the Ministry of Transportation and Communications.

The provincial program financially assists municipalities in providing a specialized transit service for those people who, regardless of age, are "unable to board" regular transit facilities. Provincial funding is available to all municipalities; a regular, conventional transit system is not a prerequisite. Although only a municipality may apply for funding assistance, with a provincially approved contractual agreement, a person, firm or corporation may actually provide the service on behalf of the municipality. Detailed guidelines provided by the Province advise how to establish a specialized transit service and how to apply for funding assistance.

Provincial funding assistance subsidizes municipal expenditures properly incurred in the provision of service. For 1985, eligible capital costs were subsidized at the rate of 50 percent. Operating subsidy was provided in two components: a "Basic" subsidy of 25 percent of eligible operating costs if the vehicles used to provide service were acquired with provincial funding assistance, 30 percent if not; and a "Passenger-Based" subsidy of \$2.60 for each eligible passenger trip served. Additional operating subsidies, within limits, were available to municipalities exhibiting an average passenger trip length in excess of 9 km and to municipalities utilizing vehicles designed specifically for transporting disabled persons. Currently, for 1986, this funding policy is being reviewed.

3.5.8 Prince Edward Island

A special transit service for wheelchair users is available in Charlottetown.

3.5.9 Quebec

Most special transit services for the disabled are operated by local public transit systems or regional systems that provide service to several communities. Provincial funding is provided through the Ministry of Transport. The program provides grants to public transportation agencies and municipalities equal to 75 percent of the cost of transportation services for the disabled. The remaining cost is divided between the municipalities (20%) and users (5%). The fare paid by the users is equivalent to the fare paid by users of conventional transit services.

Transit services for the disabled offer on-demand, door-to-door service requiring advanced registration. Some 55 transit delivery organizations for the disabled have been created since the inauguration of the program in 1979. Nearly 400 of Quebec's 1,500 municipalities are served, covering almost 70 percent of the population. In 1985, the 20,000 disabled persons registered for the special transit services made over one million trips. The government's contribution has reached the 12 million dollar level.

Access to transit services for the disabled has been governed since 1983 by a provincial policy aimed at standardizing the criteria for eligibility across Quebec and a maximum usage of the least specialized types of service. Compulsory creation of eligibility committees, comprised of municipal representatives and those representing the disabled, has permitted the channeling of eligible persons, in accordance with their degree of handicap, towards the means of transport best suited to their transportation needs. For example, the use of taxis is greatly encouraged.

Province	Program & Admin- istering Dept.	Eligibility Criteria	Delivery Mechanism	Funding by Provincial Government
Alberta (1985)	Alberta Transporta- tion: - Special trans- portation serv- ices program for the elderly, the handicapped and the disabled.	Most systems are for "adults who would have difficulty using regular transit." Small communities may serve broader cate- gories, all ages and handicaps.	Municipality is respon- sible for delivery. Several provider options including use of taxis.	75% of study costs. All rural and urban communities receive unconditional grants of \$3.00 per capita. In small cities and large towns without conventional transit serv- ice an additional \$3.00 per capita may be granted to fund a "paratransit" service.
British Columbia (1985)	BC Transit: - Handy DART or "Custom Transit". - "Paratransit" services for communities without con- ventional transit.	To assist persons who cannot use conven- tional services with- out assistance. Includes all ages, incomes, and mental handicaps.	In greater Vancouver and Victoria, BC Transit contracts directly with the operating companies; in smaller communities, the municipality is also a party to these agree- ments. Agreements stipu- late annual hours of service and operating budgets. BC Transit monitors service and assists operators with planning and technical advice.	Farebox revenue is targeted at 10% of costs. A provincial supplement contributes 25% in greater Vancouver and Victoria and 20% in smaller communities. The deficit is shared between the province and municipality in accordance with a financing formula and agreement. In the fourth and subsequent years of custom transit operation, the prov- ince normally contributes 66.7% of the deficit. BC Transit leases most vehicles to operators, funds 50% of feasibility study costs, and provides technical support.
Manitoba (1985)	Urban Affairs: "Handi Transit" program. Dept. of Highways and Transportation for rural program.	By Municipality. Eligible users are the physically handicapped who cannot use public transit. 22 rural areas served.	Municipality provides vehicles. Province sets out initial expectations of service.	Municipal - 50%. Provincial - 50% for cities and 37.5% for rural areas. Rural funding limit of \$10,000 for vehicles and \$20,000 for operations.
New Brunswick (1985)	No specific legislation.	Funding and service policies are the responsibility of the local municipal- ities.	Major cities have service.	None. Funding from the federal Urban Transportation Assistance Program (UTAP) was used until 1983.
Newfound- land	Department of Transportation.	Those persons who have difficulty using conventional transit due to a disability.	St. John's only has an on-demand service operated by local service organization.	Provision and maintenance of vehicles. Provincial operating subsidies.
Nova Scotia (1985)	Department of Municipal Affairs. (Policy adopted in 1979).	All handicapped persons.	Municipal transit agency contracts for service.	Province provides: - 50% of capital costs. - Operating subsidy of \$1.15 per capita in 1985.
Ontario (1979)	Ministry of Trans- portation & Commu- nications. Transportation for the Physi- cally Disabled.	Any municipality, regardless of whether they have existing public transit. Definition of user is physically disabled person who is unable to board regular transit facilities. No age, income limi- tation. Includes mentally handicapped who meet definition.	Municipality sets up systems and selects own operator. Province reviews con- tracts and proposals. Sets explicit service and safety standards, admin- istrative procedures and monitoring.	Province provides: - 50% of capital costs. - Basic subsidy of 25% of eligible operating costs if province assisted in funding vehicles; 30% if province did not. - Further subsidy of \$2.60 per trip. - Supplementary assistance if trip lengths exceed 9 km.
P.E.I.	No specific policy. Social Services subsidy in Charlottetown.	By municipality.	Charlottetown only has service.	None.

Table 3-2 Survey of Service Policies for Transportation for
the Handicapped Across Canada

<u>Province</u>	<u>Program & Admin- istering Dept.</u>	<u>Eligibility Criteria</u>	<u>Delivery Mechanism</u>	<u>Funding by Provincial Government</u>
Quebec (1983)	Minister des transports. Subventions au transport des Personnes Handicapees.	Eligibility committee with municipal and user advocate representa- tives. Definition based on ability to use con- ventional transit.	Municipality is key. Some 400 municipalities are served by 55 systems.	Province provides: - 75% of capital costs. - 75% of operating costs.
Saskat- chewan (1985)	Department of Urban Affairs: "Transit for the Disabled Program".	Municipalities define eligibility. Gener- ally: "To assist all persons who cannot use conventional transit systems with dignity".	Municipality. Communities own vehicles and contract for service. Province sets out certain service condi- tions.	Province provides: - 75% of acquisition of specially equipped vehicles. - 50% of operating deficit. - 75% for studies and demonstra- tion projects.
Yukon	Department of Health and Human Resources.	"Unable to use con- ventional transit" - includes physically and mentally handicapped.	Yukon Government has a contract with Whitehorse Transit only.	Yukon Government provides: - 60% capital. - 100% operating.

Table 3-2 Survey of Service Policies for Transportation for
the Handicapped Across Canada (continued)

3.5.10 Saskatchewan

Transit services for the disabled are operated in Saskatchewan by municipalities or by other organizations on behalf of municipalities. In the cities of Regina, Saskatoon, Prince Albert, Yorkton and Swift Current, the transit services for the disabled are operated by the Saskatchewan Abilities Council.

Funding for the province's "Transit for the Disabled Program" is provided through Saskatchewan Urban Affairs. The province provides up to 75 percent of the cost of acquiring specially-equipped vehicles and 50 percent of any operating deficit. The balance of the operating deficit is a local responsibility. Municipalities applying for assistance are required to provide a door-to-door transit service for the disabled. The vehicles are owned by the municipalities, who have the responsibility to set fares, hours of service and other operating policies. A third party may operate the service on behalf of a municipality.

3.5.11 Yukon Territory

Services are available only in the City of Whitehorse. Whitehorse Transit provides a specialized service to those unable to use conventional services without assistance. All persons who have physical and/or mental handicaps are eligible. The service is contracted out yearly by the Department of Health and Human Resources of the Yukon Government. The Department provides 60 percent cost of capital, and 100 percent of the operating deficit. Whitehorse Transit provides the vehicle, trained drivers, all administrative services, and maintenance.

4. DEVELOPMENT OF A TAXI VEHICLE FOR THE DISABLED

During the late nineteen-seventies, the Transportation Development Centre of Transport Canada sponsored a series of studies of appropriate vehicles for the transportation of the disabled. One result of this research was the development of prototype taxi vehicles by GSM Taxi Ltd. of Montreal. Financial support for the development of the GSM Taxi was provided by the Federal and the Quebec governments. The proposed GSM Taxi has a capacity of five passengers, three on a bench seat and two on folding seats which can be raised to provide space for a wheelchair occupant.(26) (See Figure 4-3 on page 36.) Cost estimates for the GSM vehicle were between \$20,000 and \$30,000 in 1981 when the company was demonstrating its prototype wheelchair taxi.

The commercial production of the GSM Taxi was delayed until 1984, when it was announced that Magna International Inc. of Toronto would establish a company to complete production development by 1986. A prototype vehicle in the form of a small police van was exhibited in November 1984. This vehicle is expected to be adapted to accommodate wheelchairs.(27) The necessarily long lead time required to bring a new taxi vehicle into actual assembly and marketing stimulated a search for a more short-term solution in Vancouver.

Unique taxi vehicles designed and built in Vancouver, British Columbia, to serve ambulatory and non-ambulatory persons are being operated by Vancouver Taxi Ltd. (see Figure 4-1). The taxis, which accommodate passengers within wheelchairs, are known locally as the "camel cabs" because of their distinctive raised roofs. The development of these unique taxis resulted from the support of handicapped advocate groups, taxi operators, a local manufacturer, the Road and Motor Vehicle Safety Branch of Transport Canada, and the staff, committees and the Council of the City of Vancouver. The legal operation of these taxis was made possible by the intervention of the City of Vancouver in the historic process by which taxi licences are obtained. The following sections review the role of taxis in transportation for elderly and handicapped persons, describe the research and development that preceded the development, and describes the process that led to the implementation of the "camel cab" vehicle in Vancouver. The response of handicapped users and the operators of the innovative taxi vehicle is noted.

4.1 Limitations of Conventional Taxi Vehicles

Most transportation systems for the disabled have provided lift-equipped buses or vans even where subsidized taxi services are operated. This has been necessary because of both the access and wheelchair storage space limitations of vehicles currently used as taxis. Current trends toward smaller-sized vehicles indicate that these problems will be more acute in the future. What is needed is a taxi designed for easy access to elderly and handicapped persons in a

smaller, fuel-efficient vehicle. Such a vehicle has generated substantial research and investigation by both government and industry.

4.2 Community Support for a Wheelchair Taxi

Community support for an improved taxi vehicle came from a variety of local advocate groups, taxi businesses and municipal committees reporting to the Vancouver City Council. The disabled community, represented by such groups as the British Columbia Division of the Canadian Paraplegic Association and the local G. F. Strong Rehabilitation Centre, wanted to find more convenient transportation for persons using wheelchairs. Taxi businesses also recognized the need for a special vehicle which could shorten the loading and unloading time for handicapped persons. Some taxi owners appeared reluctant to consider the provision of special services to handicapped and elderly persons because of the perceived high costs of specially-built vehicles. If these were used only by a relatively small percentage of customers, they would not be economically viable. The City of Vancouver was aware that changes would have to be made in the "Vehicles for Hire Bylaw" to create an economically viable taxi system for the handicapped.

4.2.1 Canadian Paraplegic Association (B.C. Division)

In 1975, Stan Stronge and Tom Parker, Rehabilitation Consultants for the British Columbia Division of the Canadian Paraplegic Association, were attending a conference in Tampa, Florida. When requesting a taxi to the airport, they were surprised when the dispatcher asked them if they would like a wheelchair taxi. The driver arrived and wheeled them into a taxi-van; at the airport they were wheeled from the taxi to the inside of the terminal. The convenience of the wheelchair taxi service inspired both men to work toward a similar service for the Vancouver area. During the next four years Mr. Stronge and Mr. Parker gathered more support from friends of the disabled community. Their goal was to introduce special wheelchair taxis by 1981, the International Year for Disabled Persons.

In 1979, Stan Stronge initiated the first of several requests for the creation of a taxi service that could accommodate passengers with wheelchairs. Stan Stronge wrote to Yellow Cab Co. Ltd. and to Black Top Cabs Ltd., where he had previously been employed as a dispatcher. The request for a trial period during which the conventional taxi service would be available for handicapped persons on a priority basis was rejected on the advice of the Vancouver Taxi Owners Association. The main reason for the rejection was that the taxi owners felt it would involve a loss of income from passengers likely to take longer trips than disabled passengers.

4.2.2 City of Vancouver

The Vehicles for Hire Bylaw No. 4299 (28) regulates taxis in the City. The matter of taxi licensing had been under review in 1979 by at least one municipal committee. In 1981, the City received a request from Mr. Stronge for the licensing of special wheelchair taxis. The City Council responded with some interest in the project, but was unable

to proceed because the Permits and Licences Department had no means to insist that taxi firms provide a service for elderly and handicapped persons. The City had only one category of taxi licence which was a Class "A" licence for conventional service.

In August, 1981, staff of the Permits and Licences Department had attended a demonstration of the GSM wheelchair taxi prototype. The GSM vehicle was attractive because it met the City standards for Class "A" taxi licences and would also be able to service handicapped and elderly passengers. In October the Department recommended the vehicle to the Standing Committee on Finance and Administration for the following reasons:

- It was capable of transporting a person using a wheelchair plus two other passengers.
- The high door and ceiling provided easy access for elderly passengers.
- It was Canadian built.
- The unique design (similar to a London Cab) would be a showpiece for Expo 86.

In October 1981, the Director of Permits and Licences and the City Manager of the City of Vancouver recommended the introduction of a new Class "D" Dual Taxicab licence. With the concurrence of the Director of Legal Services, the City requested that the Vancouver Development Corporation be instructed to offer thirty (30) Class "D" licences for sale on a bid basis subject to the applicant entering into an agreement to provide GSM taxicabs only, by the end of 1983. These recommendations were reviewed by the "Standing Committee on Finance and Administration".

In November 1981, the Director of Permits and Licences provided additional information regarding the creation of the new Class "D" licence in response to concerns expressed by various groups.(29)

The Vancouver Taxi Owners Association felt that the City would eventually have to subsidize the purchase of GSM taxicabs, and that the addition of thirty (30) licences in one year did not represent an orderly progression, because the City of Vancouver usually offered only 10 Class "A" licences for sale each year.

The Council Committee on the Disabled felt that the GSM taxicab was "eminently suited" for transportation of the disabled and that a City subsidy would not necessarily be required because funding for the disabled is available from a number of sources.

After reviewing concerns about a system of priority dispatch, public awareness of the service for disabled persons, and fee structures, the City Manager recommended that the original recommendation of the Director of Permits and Licences be approved in November. The enabling bylaw was put forward for enactment in December 1981, and after giving the opportunity to the public for further submissions, Bylaw No. 5496 to amend the Vehicles for Hire Bylaw was passed by City Council.(30)

The City of Vancouver offered the thirty (30) Class "D" licences for sale until December 30, 1981. The Information to Bidders specifically stated that offers for less than the entire thirty (30) Class "D" dual taxicabs would not be considered, and that the highest bid would not necessarily be accepted.

The Vancouver City Council had several goals it wished to achieve. The number of licences offered for sale was set at thirty (30) because the Council felt a new taxi company could be formed, thus providing an economic stimulus for the community. Also, if one company controlled all thirty (30) taxis for the disabled, the clients would not have to telephone several taxi firms to find an available vehicle.

The dual-purpose taxicab licence for a low licence fee of one hundred fifty dollars (\$150.00) was based on economic considerations for the taxi company owner. A licence which could be used for Class "A" purposes and Class "D" purposes enables the owner to keep the entire fleet of taxis in use. The low per annum fee was intended to compensate for the higher costs of specially-built taxis.

4.2.3 Vancouver Taxi Ltd.

The consultants interviewed Mr. Bev Hall, the owner of Vancouver Taxi Ltd., who advised that in 1980 the company had two (2) licences only when Mr. Hall decided to expand the number of taxis in the fleet. The taxi firm obtained ten (10) Class "A" licences from the City of Vancouver in 1981 for use in 1982. The twelve (12) taxis in operation from 1982 comprised a relatively small fleet. The need for further expansion caused the firm to request more licences from Vancouver City Council, but they were not successful. This need for expansion occurred during the same period that the disabled community were actively seeking a taxi firm to provide service for persons using wheelchairs. Mr. Bev Hall and the taxi company's Board of Directors were able to provide the financial backing to make the wheelchair taxi concept a reality. Therefore, Vancouver Taxi Ltd. put forward a bid to operate the Class "D": Dual Taxicab licences. Thirty (30) licences were obtained as a block expanding the number of taxi licences owned by Vancouver Taxi Ltd. to forty-two (42).

4.3 The "Dual-Taxicab" Operator

The City of Vancouver put several restrictions on the taxi operator. These include the conditions that:

- The taxicab must be a four-door sedan type of vehicle, commonly known as a GSM taxicab or of a similar type.
- The owner must advertise in the Yellow Pages of the Vancouver Telephone Directory indicating the company trade name, its capability to serve passengers using wheelchairs, and that requests from passengers using wheelchairs would receive a priority over all other requests.
- Each taxi driver was to record on the "daily record of trips" every trip that involved the transportation of handicapped persons and, in each case, whether the person was using a wheelchair.

Approval of the Vancouver Taxi Ltd. application was based on an agreement that the service would be fully operational by year end 1982. However, by September 1982, the taxi company informed the Superintendent of Motor Carriers of the British Columbia Motor Carrier Commission that GSM Taxi Ltd. of Montreal could not supply the necessary vehicles on schedule, and a search was undertaken for an alternative taxi vehicle.

Plans for a rebuilt taxi were presented to the Disabled Transportation Committee of the City of Vancouver, and approval was received in November 1982. Three used Checker Cab vehicles were purchased by Vancouver Taxi Ltd. in order to produce a prototype taxi.

4.4 The Manufacturer

Levett Auto Metal Ltd. of North Vancouver, British Columbia, is an experienced heavy vehicle repair garage with a reputation for innovative and high quality vehicle fabrication. This firm is a major rebuilder of buses for western Canadian bus lines and transit systems.

The firm was contacted by Vancouver Taxi Ltd. in November 1982, and requested to assist in the location of Checker Cabs for rebuilding as dual taxicabs. Levett Auto Metal Ltd. received the first three (3) Checker Cabs in December 1982. The construction techniques are illustrated in Figure 4-1.

4.4.1 The Prototype "Dual Taxicab"

The prototype taxi was examined by the Vancouver Board of Vehicles for Hire in April 1983. A practical demonstration was given to show the procedure for loading and unloading a person in a wheelchair. Levett Auto Metal Ltd. received approval from the Vancouver Transportation Committee and the Board of Vehicles for Hire conditional to approval from the B.C. Motor Carrier Commission, Ministry of Transportation and Highways, and the Motor Vehicle Safety Branch of Transport Canada. The prototype was tested for the following characteristics:

- body conversion sufficient to withstand side impact in a collision,
- rollover roof strength,
- tie-down anchor point strength,
- wheelchair tie-down harness,
- window glazing,
- burn rate of materials used,
- adequacy of door locks and hinges.

The first vehicle tested and approved by all of the above agencies was available for service in June 1983. Levett Auto Metal Ltd. then began work on patterns and dies to facilitate assembly-line production of thirty (30) dual taxicabs. The search for more used Checker Cab taxi vehicles began.

Checker Motors Corporation had produced a large roomy sedan, commonly known as the "Marathon". Several stretched models have been made for airport and limousine service. The company ceased production of vehicles in 1982, and now supply only replacement parts. The Checker

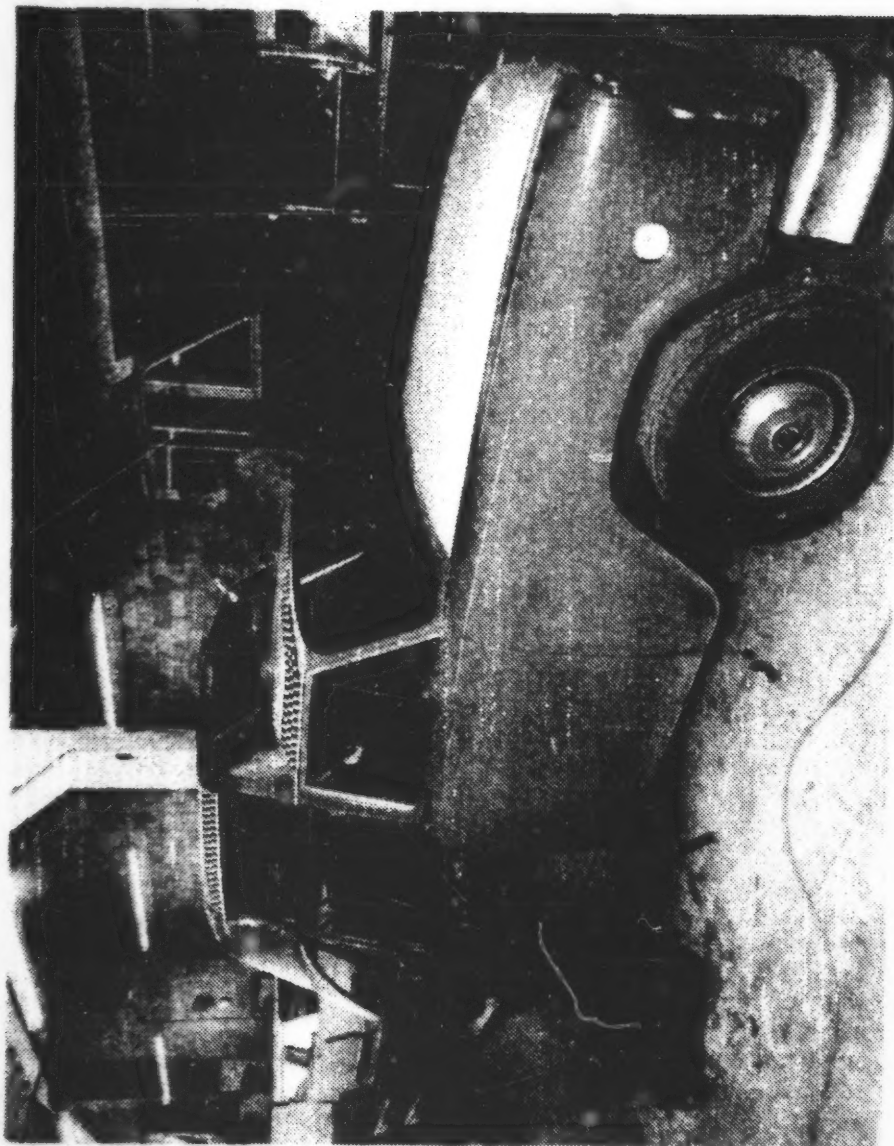


Figure 4-1 Illustrating the Construction Techniques for the Dual-Purpose Taxicab
Courtesy of North Shore News, Ellsworth Dickson photos (North Vancouver, B.C.)

vehicle was chosen because it was sufficiently large and heavy for the necessary modifications (see Figure 4-2). The main features of the modification are:

- roof raised twenty-five and one-half centimetres (25.5 cm) and reinforced for added strength,
- enlarged windows,
- double-hinged rear side doors for wider access,
- sliding metal ramp stored underneath the vehicle, with interior locking device to secure ramp storage while in transport and red dashlight to warn driver when the ramp is not securely locked,
- altered rear passenger seating to provide more floor space for the wheelchair,
- special floor matting which allows the wheelchair to maneuver without slipping,
- four ratchet-type tie-down belts to secure the wheelchair.

4.4.2 Production of Dual Taxicabs

The production of twenty-nine (29) more wheelchair taxis occurred during the twelve (12) month period between April 1983 and April 1984. The project was delayed because of the difficulty of locating used Checker Cab vehicles. The search for used Checker Cabs was undertaken by Vancouver Taxi Ltd. By June 1983, they had located twenty-seven (27) vehicles in the northwestern United States. The firm applied to Revenue Canada, Customs and Excise Office, in June 1983, for exemption from import restrictions. In August 1983, the Customs and Excise Office denied the request suggesting that new and used cars already in Canada could be converted to serve the same purpose. This made it necessary for Vancouver Taxi Ltd. to locate Checker vehicles in Canada.

By September, 1983, three (3) vehicles were ready for operation, three (3) were undergoing modification at Levett Auto Metal Ltd., and eight (8) more were being transported from Ontario. The British Columbia Motor Carrier Commission issued three (3) temporary operating permits with the understanding that they were subject to review. Authority from the Motor Carrier Commission was conditional upon the scheduling deadlines that Vancouver Taxi Ltd. had agreed to earlier. The agreement was that the taxi firm would not commence operation of the wheelchair taxis until fifty percent (50%) of the vehicles were ready for service and that the remaining taxis would be completed within the following eighteen (18) months. All thirty (30) taxis were to be in service by the end of 1983.

In September 1983, the taxi firm informed the Superintendent of Motor Carriers that all of the vehicles would not be completed by the end of the year. The company applied to the City of Vancouver for a ninety (90) day extension of the completion date, which was granted. All thirty (30) converted Checker Cabs were completed by March 1984.

4.5 User Response

Arrangements were made to interview users of the "Camel Cabs", a nickname for Vancouver Taxi's dual cabs. Persons were given advance



Figure 4-2 Illustrating the Production Model of the Dual-Purpose Taxicab
Courtesy of North Shore News, Ellsworth Dickson photos (North Vancouver, B.C.)

notice of an opportunity to discuss their experiences. Those who offered comments did so voluntarily. The following is a representative sample:

- Sitting sidewise is not comfortable for some persons due to neck strain.
- Additional driver training is needed with respect to tie-down straps.
- When a person in a wheelchair needs to sit with a leg extended, it is a tight fit to close the door.
- The fares are expensive. (Regular taxi fares are charged.)
- The wheelchair taxi provides a convenient service.
- Sometimes the tie-down straps are twisted and the drivers are in too much of a hurry to attach all four straps.
- The impact of quick stops is greater for quadraplegics because they lack upper body muscle strength and balance to compensate for a jolt.
- Communities outside Vancouver have a need for such a service.
- The concept should be developed across Canada, since many persons who use wheelchairs travel.
- Before the wheelchair taxi, there was no way to get around the city on short notice.
- The wheelchair taxi service appears to be unique to Vancouver.
- Elderly couples travelling together where one uses a wheelchair are frequent users of the service.
- The service attracts a different group of users than those who use the BC Transit handicapped service.
- Drivers are obligated to take passengers in wheelchairs, whereas conventional taxi services are not.
- Some drivers are reluctant to use the access ramp.
- Drivers sometimes have difficulty with locking the ramp in place.
- The roof window is an asset for sightseeing.
- Fares covering the distance to and from a destination are not consistent.
- Fares too costly for a long trip.

The wheelchair taxi service is welcomed by the disabled community and by the support groups. The service allows greater access to rehabilitation programs and a more active social life. Some users also feel that there is a gap between the concept and the reality of their experiences. The most often repeated negative comments were related to problems with the four tie-down straps. The comment made by most persons is that the convenience of a wheelchair taxi meets a need which disabled persons have long acknowledged, and the general public has become more aware of this need.

4.6 Operator Experience

The operation of thirty (30) wheelchair taxis has been reasonably successful for Vancouver Taxi Ltd. It comprises about fifteen to twenty percent (15-20%) of total company business. Initial costs and replacement costs for the specially-built wheelchair taxis are higher than the same costs for regular taxis. The company estimates that it will take about two and one-half years to recover their initial costs.

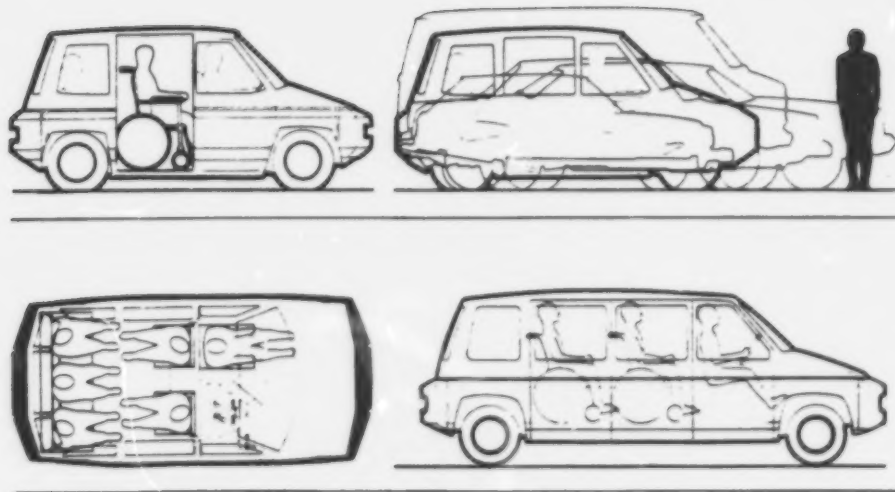


Figure 4-3 Illustrating the GSM Taxi Design Concept
(Courtesy Taxi GSM Ltée., Montreal)

5. RIDESHARING ACTIVITIES

Notwithstanding all the marketing efforts by transit and paratransit service operators during the nineteen-seventies, they were not able to satisfy all the needs of the commuters. Because of the energy crisis and the rise in automobile operating costs, ridesharing is emerging as an option that is attractive both for urban planners and commuters. The Canadian government, through Energy, Mines and Resources Canada (EMR), has established an incentive program to encourage ridesharing. EMR is preparing a marketing package for distribution in 1985. New projects have been recently implemented in Quebec, Nova Scotia and New Brunswick. Market studies have been undertaken by EMR in British Columbia, Saskatchewan, Manitoba and Alberta.(31)

Ridesharing usually takes two major forms:

- the use of individually-owned automobiles rotated among persons who usually know each other and where there is no exchange of money;
- formally-organized arrangements between drivers and passengers.

A third form of ridesharing noted in a Quebec report (21) is the sharing of taxi services. Ridesharing enables a group of people to travel together in a taxi to work or to school. A contract is drawn up between a taxi company or a taxi driver and the group or their representative.

After some initial experimentation with community-wide ridesharing, Canadian planners have accepted that work-based ridesharing is more likely to be successful. The Province of Ontario has produced implementation handbooks for both carpooling and vanpooling with the notation, "A Guide for Companies".(32)(33)

5.1 Quebec Experience

Covoiturage Quebec Inc. is a private, non-profit organization founded by the Roads and Transportation Association of Quebec in 1982 through financial support from the Province of Quebec and EMR Canada.(34) A board of directors representing business and transport and the municipal, provincial and federal governments is responsible for operating policies. Covoiturage Quebec was founded to promote ridesharing by working to remove institutional constraints and organizing pilot projects to demonstrate the validity of carpooling and vanpooling.

In 1983 Covoiturage Quebec was successful in influencing the Government of Quebec to legalize remunerated ridesharing. Currently the organization is working to obtain incentives for ridesharing such as reserved parking and the removal of toll charges as well as providing a "free" technical and advisory consulting service to promote

ridesharing. The organization has the necessary resources to assist in the leasing of equipment and the organization of carpooling, vanpooling and shared-ride taxi service. Covoiturage Quebec works directly with business organizations and local governments to promote the development of ridesharing projects.

There are few constraints to ridesharing in the Province of Quebec. A no-fault, compulsory automobile insurance program covering bodily injuries which was introduced in 1978 makes no distinction between ridesharers and car drivers carrying passengers. The automobile used must simply be insured for the category of "driving to work". Property damage insurance coverage by private companies is not anticipated to be affected.

For vanpooling, two types of special vehicle plates are available, one for non-profit organizations and another type when a profit is involved. Both types of plates entitle the vehicle to toll-free passage on freeways. A chauffeur's licence is required to drive these vehicles.

A survey was conducted by Covoiturage Quebec in 1984 to determine the current level of response to the concept of ridesharing. From this survey and other transportation statistics it was estimated that:

- Some 22% of all person trips by motor vehicles were being made in a shared-ride mode. (In Quebec this amounts to about 527,000 person trips.)
- By 1984 some 1,200 industry-based carpooling and vanpooling units had been established in the Montreal region alone. New units were being formed at the rate of three (3) to five (5) per week in the spring of 1984.
- In local municipalities some eighty (80) carpooling projects had been established.
- In total, some 1,400 carpooling units and eleven (11) vanpooling units were in operation.

5.2 Ontario Experience

In Ontario, the majority of vanpools are either privately operated by an individual or sponsored by an employer. There is, however, an alternative to these two conventional types of vanpools: the vanpool agency, which will supply a van for commuter groups. In Ontario, this is OVPO, the Ontario Van Pool Organization, an affiliate of the Ontario Energy Corporation, which has been providing vans for commuters since 1980.(35)

OVPO was originally set up to show that the concept of third party vanpooling could be entirely self-sufficient financially to the point of showing a profit, thereby encouraging the private sector to become involved. As a vanpooling agency, OVPO has the following characteristics:

- OVPO owns the vans, insures and maintains them. Should the vanpool fail or disband for any reason, the van can be returned to OVPO with only 30 days notice. Neither driver nor rider suffer a penalty.

- OVPO riders come from combinations of both the public and private sectors, with the only criteria being that the poolers' places of work and home locations are suitable for the operation of a vanpool. Consequently, OVPO can often organize vanpools that a single company might not be able to.
- Unlike most employer-sponsored or private vanpools, a margin to cover administration and profit is incorporated into the fares. As a result, OVPO fares are normally higher than those experienced with other vanpools.

The Government of Ontario has been actively involved in promoting a "Share-A-Ride" program since the late nineteen-seventies. A carpool implementation handbook was published by the Ontario Ministry of Transportation and Communications (MTC) in October, 1978. This was followed by a vanpool handbook in 1979. These handbooks were revised and updated in 1983.(32)(33) The original promotional materials and forms used in the Ontario vanpool handbook were adopted by Energy, Mines and Resources Canada when preparing the Canadian vanpooling guidebook.(36) Currently 14 employees are operating a total of 126 vanpools in Ontario. Three of these companies also provide a carpool matching service.

The Transportation Technology and Energy Branch of the MTC published an inventory of employer-sponsored vanpooling in April, 1984, based on Share-A-Ride surveys of 14 projects conducted in 1983 and 1984.(37) Some of the highlights from the survey are as follows:

- The number of vanpools operating in Ontario has grown steadily since 1977 when the Public Vehicles Act was amended to permit vanpooling. In 1983 there was a 12.5% increase in the number of employer-sponsored vanpools.
- The typical pilot program started with two or three vanpools.
- Seven companies operated vanpools at more than one worksite.
- Seventy-seven percent of the sites had a workforce of more than 600 employees.
- Fifty percent of the vanpools involved employees who were on shiftwork.
- Employee relations and saving energy were the two most frequently-mentioned factors that motivated companies to start vanpooling programs, followed by parking problems and company relocation.
- The most frequently-mentioned corporate benefits of vanpooling were favourable corporate publicity, followed by reduced parking congestion and improved punctuality.
- All 14 companies surveyed paid the program administration cost.
- Three companies absorbed 100 percent of the insurance premium cost.
- Twelve companies provided priority parking privileges.
- Eight companies charged low or no interest on money advanced.

- Eleven companies had automatic payroll deduction plans for fares.
- Most companies did not charge the drivers for their rides.
- All the companies allowed the driver personal use of the van.
- Twelve companies offered the driver the right of first refusal to purchase the van after its service life.
- Ten companies used an incentive fare system of benefit to the driver.
- Two companies allowed non-employees to ride in their vanpools.
- Seven companies required that vanpool drivers take a driver education course.
- Eighty-four percent of vanpoolers had door-to-door service.
- Propane was an increasingly popular fuel for vanpool vehicles. Five of the companies surveyed operated a total of 18 propane-fueled vans. Nine companies would consider using propane in the future.

5.3 Experience in Other Provinces

The City of Calgary, Alberta, is offering "free" downtown parking as an incentive. The Province of Alberta has offered employees forming carpools reserved priority parking space as an incentive. The employees must register their carpool and guidelines are provided.(38)

An organization known as "Vanpools Ltd." was created in Nova Scotia in 1981. By 1984 some fifteen (15) vanpools were in operation.(31)

In Fredericton, New Brunswick, some nineteen (19) park-and-ride lots have been established for carpooling.(31)

5.4 Ridesharing Associations

Two national organizations actively promote ridesharing in North America. These are the Association for Commuter Transportation (ACT), formerly the National Association of Vanpool Operators (NAVPO), and the Canadian Association of Vanpool Operators (CAVPO), established in 1982. These two associations are to hold their first joint meeting in Toronto in April, 1985.(39)

6. INSTITUTIONAL AND REGULATORY ISSUES

Paratransit by definition is a hybrid service combining various facets of operation, labour arrangements, vehicle types and dispatching systems. For paratransit to flourish, there must be room for local initiatives, entrepreneurship and flexibility. Overly restricted institutional procedures and constraints will kill it. Labour issues have plagued the U.S. systems more so than the Canadian ones because most paratransit systems in Canada are public systems. However, labour issues will definitely assume a new dimension if more systems such as shared-ride taxis using non-unionized labour are set up. Therefore, given these institutional factors together with the higher transit demands related to more compact land use patterns in large cities, paratransit has a greater chance to flourish in low-density communities, in small cities, and in rural areas in Canada than in the larger cities where the transportation systems are more structured.

There are a number of regulatory issues that need to be reviewed, some of which are related to the size of community served, and others related to the technology. For example, many of the current transport systems designed primarily for the use of the elderly need to be modified to serve handicapped persons. This includes taxi systems that are unable to accommodate wheelchair users and small bus and van systems where vehicles are not equipped with ramps or lifts. It is not clear whether such issues will be resolved by market forces or by government regulation.

Small communities are concerned with all aspects of service for the handicapped because systems are often in the early stages of implementation and development. Medium-sized communities are concerned with costs and organization for systems in place and large cities are struggling with the coordination of a multiplicity of service providers. Issues common to all sizes of communities include:

- Taxi Deregulation;
- Labour Issues;
- Insurance for Ridesharing.

There appears to be a major difference in the way in which special services for the elderly and handicapped can be efficiently dispatched, depending upon the size of the community being served. Up to a population of about 200,000 persons, such systems can be operated reasonably well by manual dispatching with electronic data processing of records in the larger communities. In communities with populations above 200,000 persons, the manual dispatching systems become cumbersome. At present there is a substantial search underway for more cost-effective, automated dispatching systems.

6.1 Small Communities and Rural Areas

There are two basic services that can be used for public transportation in the small communities and rural areas. These include taxi systems normally using conventional automobiles and small bus and van systems often equipped with wheelchair accommodation. Some communities may have more than one type of these services in effect. The taxi systems are often subsidized for the elderly and the handicapped. With the exception of those systems noted in Section 2.2 of Chapter 2 of this report, most taxi services are of the exclusive ride type.

Residents of small communities and rural areas who are elderly or handicapped often have a greater need for specialized forms of transportation than those who reside in cities. The reasons for this are as follows:

- Conventional public transit systems generally do not exist in communities of less than 10,000 persons.
- Small communities may not be able to provide sufficient business to support a taxi company.
- Distances to major local activity centres are usually greater due to the necessity of centralizing of institutions.
- Low density and linear rural development patterns increase walking distances and feelings of isolation.
- Remote employment locations may reduce the availability of automobiles during the day.

Transportation services for the elderly and the handicapped (E & H services) are delivered in a great variety of ways in small communities and rural areas. A specialized E & H service may be provided through the following organizations:

- service clubs,
- senior citizen associations,
- social service agencies,
- private societies,
- handicapped associations,
- community action groups,
- municipal operation or contracts,
- institutions (hospitals).

In most cases the service is provided through contractual arrangements with the municipality or municipalities served. In several communities more than one type of service is delivered by co-operating agencies. Frequently, the system provided is shared between more than one municipality.

Transportation service policies are usually a reflection of the organization delivering the service. It is not surprising that senior citizens associations tend to develop systems that primarily service the elderly, while community action groups tend to respond to broader needs. Service policies include both eligibility criteria and system characteristics. Typical service policies include:

- eligibility criteria and priorities,

- trip priorities,
- pricing policy,
- hours and days of service,
- service area.

6.1.1 Eligibility Criteria

The most common eligibility criteria in descending order of inclusiveness are as follows:

- All persons may use service.
- All mobility disadvantaged may use service.
- All E & H may use service.
- All adult E & H may use service.
- Seniors only may use service.
- Disabled only may use service.
- Special needs only may use service.

6.1.2 Trip Priorities

Most systems designed for E & H passengers assign trips or make vehicles available for service for the following purposes in descending order of priority:

- medical appointments,
- shopping and personal business,
- social/recreational,
- out-of-town excursions.

Systems that cater to a larger segment of their population (all mobility disadvantaged) may also include the following as receiving priorities similar to those for medical appointments:

- work trips,
- school trips,
- service for daycare centres,
- hospital visiting,
- patient travel for nursing homes and auxiliary hospitals,
- physio-therapy access.

Most systems offer trips on a first-called, first-served basis. The subsidized taxi systems usually must limit total trips so as not to exhaust available funds.

6.1.3 Pricing Policies

Pricing policies vary widely. Some systems are "free" to the user. Some provide a vehicle and the users are expected to pay the operating costs. The subsidized taxi systems usually collect part of the taxi fare from the users. This amount may vary with vehicle occupancy.

(a) Shared-Cost Services (Nominal Fees): These systems normally share the cost with their users from a nominal fee up to 50% of the cost.

(b) Fixed Subsidies: These systems usually provide a flat-rate subsidy for taxi services with the users paying the balance of the taxi fare.

6.1.4 Hours and Days of Service

The hours and days of services are usually greater for the subsidized taxi systems than for bus and van systems where a dispatcher must be provided by the operator. The van and bus systems usually operate on-demand during regular office hours and must be pre-booked at least 24 hours in advance for other trips.

6.1.5 Service Area

Service areas often include the surrounding municipalities or nearby towns and villages. Some systems provide a regional service. Some systems provide for excursion trips only, however most systems provide some local services. Service to the doorstep is quite common.

6.1.6 Staffing

The operating staff for E & H systems include volunteers, part-time employees, full-time employees, flat-rate payments and combinations of the foregoing. Often the vehicles are being dispatched from public service offices at no administrative cost to the system. Drivers may be involved in maintenance of vehicles in small systems. Many systems utilize volunteer dispatchers.

6.1.7 Dispatching

Social services offices are frequently used as dispatch centres. Senior citizens often answer the telephones. As many dispatch offices are staffed by volunteers, this service represents a hidden subsidy to the local service.

Taxi systems in the small communities are able to integrate subsidized taxi services and generally cater to the elderly and the handicapped without adding staff. The taxi drivers usually try to be in the areas that need service at a particular time so that dispatching is simplified. For example, if a particular senior citizens home generates trips at regular times, taxis will wait there for trips. This reduces the demand on the dispatching facilities. The cost of dispatching is included in the flat rate charged for the taxi service.

6.2 Medium-Sized Communities

The most troublesome issues in medium-sized communities at present appear to be both financial and organizational. As the demand on special services for the handicapped increases, urban communities operating parallel bus and van services for the handicapped find the cost to be very high in comparison to their transit system costs. The high cost also appears to result in gradual withdrawal of non-profit social organizations from the role of providing special transit service for the handicapped. For example, the B.C. Lions Society discontinued

its involvement in adult services in the Vancouver area in spring of 1981, as did the Edmonton Handibus Association. Each time a change of organization occurs, the new operator has to go through the learning process all over again. As social agencies move out of the scene, local handicapped groups or profit-making private enterprise will likely move into the vacuum. There is a recognized need to streamline contractual arrangements to ensure that there are no undue service disruptions or deterioration when turnover of operators occurs. The experience in California with the beginning of a new generation of privately-operated, predominantly publicly-financed taxi companies providing paratransit services is being observed with interest.

6.3 Large Urban Centres

Some degree of computerization is inevitable in paratransit operations for large urban centres in this electronic age. Computer-assisted dispatching, electronic data recording, the sorting of subscribers' requests, and routine data management using micro-computers will become more prevalent. Experimentation of the brokerage concept applied to handicapped transit services is imminent in Canada. The inherent advantage of the brokerage concept is its ability to penetrate multiple jurisdictions and to spearhead a specific transportation service function. There is some expectation without being overly optimistic that the concept will be able to cut costs substantially. Based on the U.S. experience, there is not yet any conclusive evidence of that, although service improvements were attained.

The Transportation Development Centre of Transport Canada has been investigating computer scheduling and routing for the larger E & H systems.⁽⁴⁰⁾ The objective of this research project was to develop an advanced computer model that could be used to automatically schedule and route special transit services for the E & H travel market.

The proposed model was intended to interface with the wide variety of data bases already compiled by transit operators across the country. These data bases normally include such information as origins and destinations of passengers, time of pick-up and drop-off, travel distances between pick-up points, travel times at various periods of the day, and equipment available. The model would integrate this information with demands for new service requests or cancellations and provide automatic scheduling and routing.

Researchers are to test the model in four Canadian cities of different sizes and prepare a user's manual. The route coding for two cities, Montreal and Sherbrooke, Quebec, has been completed. Coding for routes in Ottawa and Toronto is well underway. The essential algorithms for the model have been defined. Researchers are now calibrating the algorithms and defining the optimum program for each route.

Similar applications of computer-assisted scheduling and routing are being investigated for Vancouver, British Columbia, and Edmonton, Alberta. In these cities it is proposed to have a central brokerage agency handle the routing and scheduling for a variety of individual service operators.⁽⁴¹⁾⁽⁴²⁾

6.3.1 The Brokerage Concept

Brokerage implies that the agency dispatching the service is not necessarily the vehicle operator. This is common with taxi firms where the vehicles are owned by individuals and dispatched by a broker. Substantial research is currently underway in North America on the potential for computerized brokerage systems that may be considerably more cost effective than the systems currently in use in the major cities.

Since the level of service to the users, the overall service cost, and the productivity of the system is mainly dependent upon the efficiency of the dispatching centre, the trip broker, in effect, would become the system manager. If the broker was under contract to a City or was a City employee, then the broker would be responsible to the City to use the most appropriate and cost-effective mix of service providers. Some informal brokerage activities are occurring now where dispatchers locate an alternative provider for persons who are not eligible for their particular service. More of this would be expected to occur in the future.

6.3.2 The City of Edmonton Brokerage Demonstration Project

The objectives of this study were as follows:

- To review the administrative and organizational framework for the Disabled Adult Transportation System (DATS) to determine if a more effective organization could be developed.
- To review the potential for a more comprehensive "brokerage" of several service providers under one dispatch centre equipped with new dispatch technology.
- To investigate the potential for cost savings through a more effective service organization that would accommodate latent demand for service within the existing DATS budget.

6.3.3 Automated Dispatching

At present there are three types of dispatching systems under development. These include the more traditional zone-based systems similar to those in operation in automated taxi dispatching systems (Blue Line Taxi in Ottawa, Diamond Taxi in Montreal, and Co-op Taxi in Edmonton) operating on mainframe and "mini" computers. A second type of system uses clustered micro-computers, with a pre-coded user registration file. This is the HAGI system (43) being considered by BC Transit. A third type of system is the on-line/real time, interactive, integrated system being developed in Toronto. (44)

6.4 Taxi Deregulation

Most urban municipalities in Canada have some form of taxi regulatory bylaw and/or licensing control of taxis. In the past, the numbers of new taxis allowed to operate in the larger cities have often been based on population growth; for example, a ratio of one taxi per 1,000 persons. Where these ratios have applied, competition has been limited and the price of a taxi licence, changing hands privately, has been very high (typically in the \$35,000 to \$50,000 range). This situation has not always worked in the best interest of the consumer.

Recently, both provincial and municipal governments have become interested in taxi deregulation. This has taken the form of removing the restrictions on the numbers of taxis in service and the types of trips that can be accommodated. Examples of deregulation are to be found in Alberta, where the licences are not restricted, and in Quebec, where the Ministry of Transport has taken steps to eliminate regulatory obstacles which prevent taxi companies from offering "more diversified" (paratransit) services.(22)(41)

6.5 Labour Issues

Organized labour is taking an increasing interest in the attempts of transit management to replace higher-cost fixed-route bus services with lower-cost taxi feeders. Less attention is being paid to the substitution of taxi services for the elderly in place of the more expensive lift-equipped vehicles and services for the handicapped. The least sensitive applications of paratransit services are those that are either operated by transit union labour or those which pay "union scale" to their employees, who may or may not be in a union. Both the Amalgamated Transit Union (ATU) and the Independent Canadian Transit Union (ICTU) have opposed the use of taxis as a substitute for conventional transit.

The City of Edmonton has, to a certain extent, avoided these conflicts by contracting with private bus firms to operate bus, van and automobile services for the handicapped. The drivers for the major contractor, operating lift-equipped vans and buses, are members of the ATU. Other drivers are paid at similar rates to the ATU drivers, who are paid less than the conventional transit drivers.(42)

6.6 Insurance for Ridesharing

Insurance for ridesharing has not generally been a major constraint to implementing services. In most provinces, 'no fault' insurance is available based on the primary purpose of the vehicle. In British Columbia, for example, the vehicle would have to be insured for travelling to and from work or school. This coverage is not subject to additional penalties unless the vehicle is used for commercial purposes.

In the Province of Quebec, legislation was introduced in 1978 to effectively remove the constraint resulting from high insurance costs.(34) In Ontario, the insurance industry is reviewing the risks associated with motor vehicle accidents where multiple claims may occur. Members of the Canadian Association of Van Pool Operators (CAVPO) suggest that operators of vanpools discuss their needs with their insurance agents and brokers. At present wide variations in insurance quotations are being experienced.(39)

7. ANALYSIS AND CONCLUSIONS

Well-designed fixed-route bus transit systems have provided a reasonably high level of transit service to ambulatory persons living in medium to high density subdivisions, who need a direct route to the central business district of Canadian cities. Not so well served are the elderly and handicapped and those who live in low density urban and rural areas or whose destinations are outside of the service area.

As rapid expansion took place in urban areas in the 1960's and 1970's and a more vocal and affluent society demanded higher standards of service, these fixed-route transit systems often ceased either to be economic or to provide good service to the lower density suburbs. It became very expensive to provide good area coverage for population densities below 5,000 persons per square kilometre. Travel times increased when arterial streets became congested and as neighbourhoods became isolated in a maze of crescents and cul-de-sacs. Handicapped persons found it difficult to live in such areas because of the lack of easily accessed public transportation.

Transit planners of the 1970's became interested in other types of transit services that had the potential to better serve the low density suburbs. These services included dial-a-bus systems, shared-ride taxi-transit, and a range of carpooling and vanpooling schemes. These less conventional forms of public transportation became collectively known as "paratransit" and the systems using the telephone for access to service as "dial-a-ride services".

7.1 Canadian Experience

Experience in Canada with paratransit service has demonstrated that:

- The dial-a-ride type of system can provide a good exclusive or parallel level of service for the elderly and the handicapped, providing accessible vehicles are used.
- Dial-a-ride is financially viable for certain transit applications where the demand is limited in any community, but particularly in small communities and rural areas.
- Interventions in taxi regulation can broaden the scope of taxi services and generate the production of new, more accessible vehicles.
- Paratransit feeder services must be sold to transit unions on the basis that the marketing of transit services is beneficial in the longer term when growth in demand inevitably requires fixed-route buses.

- Work-based ridesharing is likely to be the easiest system to implement, however incentives for general ridesharing including reserved parking, removal of tolls and universal no-fault insurance programs have been beneficial.
- One of the most effective ways to ensure that special systems for the elderly and handicapped are implemented is to provide dedicated "seed money" and allow the communities to design their own systems with a minimum of interference by senior governments. Any over-regulation of such services tends to inhibit local initiatives.
- For those segments of the handicapped clientele who can use them, taxi services are much more cost-effective than dial-a-bus services.
- The cost-effectiveness of large-scale applications of special services for the handicapped are limited by both organizational and technological constraints. The most promising concept at present for the larger cities is that of a brokerage centre directly responsible to the City for coordinating all services using the latest in computer systems for both data management and dispatching.

7.2 Future Applications

A summary of typical paratransit applications and the estimated cost per passenger trip, developed by the consultant, is presented in Table 7-1 on page 52.

7.2.1 Dial-A-Ride Services

Canadian researchers accept that for dial-a-ride to be an option in the future, transportation planners and decision-makers must recognize that it is basically a social service concept rather than a technological concept, developed in response to needs generated by particular demands or land uses (low-density suburbs in cities or for small towns) and by special user groups (e.g. the elderly and the handicapped). It is a supplementary service rather than a replacement for conventional transit services. The service is management intensive and therefore the organization delivering the service must be carefully selected to ensure continuity.

7.2.2 Shared-Ride Taxi-Transit

The financial benefits of a system in which most of the administrative and dispatching infrastructure is already in place has just recently been understood. The major constraints to expansion of taxi services are the rate at which accessible vehicles can be obtained for the handicapped market and the development of accountable fare subsidy mechanisms. The future potential for taxis to replace or supplement a wide range of transit and paratransit services is very substantial.

7.2.3 Ridesharing

Ridesharing was conceived as being a method of conserving energy in Canada. Experience in both Canada and the United States has shown that ridesharing has many other benefits, including:

- more efficient use of parking investments;
- enhancement of transit usage;
- lower cost alternative to rural bus service;
- marketing tool for industry;
- enhanced labour relations.

7.2.4 Public Automobile Systems

There is no apparent interest in the very short-term auto rental (STAR) approach in Canada at present; however, this concept has been around since the early nineteen-sixties. A STAR service was introduced in San Francisco in December, 1983, within a 10,000 resident apartment complex.⁽⁴⁵⁾ The service offers an alternative to owning a second car, and encourages both the use of public transportation and ridesharing. The concept is mentioned here because it is a potential spin-off from both the ridesharing associations, who lease vehicles, and the brokerage systems.

7.2.5 Brokerage Applications

The major benefit of a brokerage system is that it allows existing transportation resources to be used for other purposes. The marginal costs are less than those for exclusive, dedicated services, because the capital amortization costs can be spread over a larger volume of business and little or no additional administrative overhead is required by the service operators.

With the current emphasis, by all levels of government, on privatization, the brokerage concept will likely emerge as a preferred way to deliver transportation service to the elderly and handicapped, particularly where a mix of service providers must be coordinated. Applications are likely in most cities of 500,000 or more in population.

7.2.6 Integrated Public Transport Systems

If the brokerage concept proves to be very successful, it is inevitable that public transit systems will feel the impact. At present, most transit systems in Canada are publicly-operated monopolies which are monolithic in structure and slow to respond to changing social conditions. While operating subsidies on conventional transit services are much less on a per passenger basis than for the special systems that serve the handicapped, the aggregate subsidies average about \$60.00 per capita annually. The brokerage systems will, no doubt, be closely scrutinized by policymakers for potential applications to transit.

<u>Paratransit Service</u>	<u>Typical Applications</u>	<u>Typical 1985 Cost Per Passenger Trip</u>
Dial-a-ride (bus)	(a) Transit feeder systems for medium to low density urban	\$5.00
	(b) Exclusive services for the handicapped	\$14.00
Dial-a-ride (taxi)	(a) Transit feeder systems for low density urban	\$3.00
	(b) Exclusive services for the handicapped	\$7.00
Route deviation (bus)	Transit for low density urban and rural areas	\$2.00/\$3.00
Shared-ride taxi-transit	Transit system for small urban communities (under 25,000 population)	\$1.50/\$2.00
Taxi feeder services	(a) Low density sub-divisions in any urban community	\$3.00
	(b) Rural areas	\$10.00/\$20.00
Ridesharing	(a) Carpooling	\$1.00
	(b) Vanpooling	\$1.00
	(c) Taxi contracts	\$2.00/\$3.00

Taboe 7-1 Summary of Typical Paratransit Applications and Estimated Cost Per Passenger Trip in \$ 1985

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